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BATTLESHIP DELAWARE LAUNCHED.

The launching of the United States battleship Delaware occurred at the plant of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., Feb. 6, in the presence of a distinguished assemblage including Assistant Secretary of the Navy Satterlee, Gov. Pennewill, of Delaware, and his staff, Lieut.-Gov. Mendinhall, a delegation from the Delaware legislature, as well as Rear Admiral Taussig and other naval officers.

The ship was christened by Miss Anne Pennewill Cahill, of Bridgeport, Del., a niece of the governor.

The Delaware is one of the four sister ships authorized by congress which are to surpass any battleship now known, either completed or under construction, in any navy in the world. The other constituents of this formidable quartet are the North Dakota, now completing at the plant of the Fore River Ship Building Co., at Quincy, Mass.; the Florida, which is to be built at the New York navy yard, and the Utah, which will be constructed by the New York Ship Building Co., Camden, N. J.

A POWERFUL VESSEL.

The Delaware is to carry as heavy armor and as powerful armament as any known vessel of its class, will have a speed of 21 knots, which is believed to be the highest practicable for a vessel of this type and class, and will have the highest practicable radius of action. The arrangement of her main battery guns is such as to permit a broadside fire 25 per cent greater than that of the broadside fire of any battleship now built, or, so far as is known, under construction. Her defensive qualities, other than those dependent upon armor protection, are such as to give the maximum degree of protection to all the vital portions by means of unusually effective compartmental subdivision, so that, in conjunction with her armor protection, the defensive qualities of this vessel are believed to be distinctly superior to those of any battleship hitherto designed.

The hull is protected by a water-line belt of armor 8 ft. in width, whose maximum thickness is 11 in. This armor belt gives effective protection to the boilers, machinery, and magazine spaces. The side above the main armor belt is protected by armor 7 ft. 3 in. wide and of a maximum thickness of 10 in. Above the main casemate armor amidships the side is protected by armor of 5 in. thickness, which affords protection to the smokepipes, the major portion of the secondary batteries of 5-in. guns, and the hull structure.

PLANNED BY BOARD.

The plans for the Delaware were prepared by the board of construction of the navy department in competition with plans submitted by various naval architects and ship building companies and which were submitted to a special board under the presidency of Truman H. Newberry, formerly assistant secretary of the navy. These plans were later approved by congress and the contract for building the Delaware was placed Aug. 6, 1907, on a bid of $3,987,000. Her keel was laid Nov. 11, 1907.

The Delaware is 510 ft. in length on the load water line, 85 ft. 2 in. beam and has a mean draught of 27 ft. Her coal bunker capacity is 2,500 tons, which is sufficient to send her at a ten-knot speed a distance of 6,720 knots, or twenty-eight days' steaming. Provision is also made for the stowage of a large amount of oil fuel without in any degree reducing the capacity of the coal bunkers. She will have triple-expansion reciprocating engines, and will require over 900 men to man her.

Her armament will consist of a main battery of ten 12-in. breech-loading rifles and her secondary battery will include 14 5-in. rapid-fire guns, four three-pounder saluting guns, four one-pounder semi-automatic guns, two 3-in. field pieces and two machine guns of 0.30 calibre. The Delaware is equipped with two submerged torpedo tubes.

This great fighter will have a displacement on trial of 20,000 tons, or 2,100 tons greater than the British Dreadnought and 750 tons greater than the Vanguard, Britain's latest vessel of the Dreadnought type.

MAURETANIA MAKES RECORD.

The Cunard line steamship Mauretania, which left New York, Feb. 3, for Queenstown and Liverpool passed the Daunt's Rock light at 5:10 P. M. Feb. 8, thus establishing a record for the eastward passage across the Atlantic. The distance covered was 2,934 miles and the passage was made in 4 days, 20 hours and 27 minutes, the liner maintaining an average speed of 25.20 knots. The time is reckoned from the passing of the Sandy Hook light and the Mauretania on this remarkable trip not only broke the record for the eastbound passage but that for the highest day's run, which was 605 knots for a 23 hour day, equivalent to 660 knots for a 25 hour day.

The Mauretania covered what is known as the "long course," for which she also held the previous record for the eastward run, 5 days and 5 minutes, made in March, 1908. The best time over the course was made by her sister ship the Lusitania, in December, 1907, when she covered the distance in 4 days, 22 hours and 29 minutes.

Owing to the heavy seas the Mauretania was unable to land her passengers and mail at Queenstown and they were carried on to Liverpool. This circumstance is believed to indicate that even

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more can be expected of the Mauretania under different weather conditions.

When Capt. Pritchard became commodore of the Cunard fleet some months ago he asked to be put in command of the Mauretania rather than of her sister ship, the Lusitania, for he contended that the Mauretania was the faster ship, that with her he would break all records. His judgment has now proved itself correct, for the Mauretania holds the eastbound record.

THE PROGRESS OF RIVER IMPROVEMENTS IN THE VICINITY OF PITTSBURG.

BY J. W. ARRAS.

(Continued from Feb. 11.)

One thing stands inevitably in the way of the general use of bear-trap gates for navigation purposes. They cannot be introduced in long sections, such as for navigable passes or for shorter dams over their entire length, because of their rapid movement both upward and downward, which in the first instance would cause a too sudden reduction in the river's discharge, and in the latter case would create an immense wave, destruction alike to everything afloat both above and below it. As an automatic weir for pool regulation and rise control, however, it has no equal, and its popularity for such use will undoubtedly continue unless a better device is discovered. It is probable that in future constructions, traps of varying widths will be introduced, thus affording greater flexibility to the system and more readily accommodating the operations to the varying conditions of the water.

CHANOINE WICKET WIERS.

In the operation of the upper Ohio river dams the Chanoine wicket weir has up to the present time occupied but an unimportant place, perhaps much more so than it will in the future. It was the original intention to have this weir act as the main regulating and rise controlling feature. With the navigable pass up, the weir was to be of sufficient width and discharge capacity to permit the passage of the stream at a comparatively high stage in order to prevent a material increase in the height of water above the dam. First the river was to be raised slowly as the needs of the pool might indicate, to be followed when entirely up by the raising of the automatic weirs or beartraps. Several reasons may be assigned for failure to operate the wicket weirs more generally. First, the Davis island dam had been provided with such weirs on an extensive scale. These were not long and were expected to work easily from the service bridge above. On the contrary, however, their operation proved unnecessarily laborious. Even the shortest wickets, only 9 ft. 9 in. long, were hard to maneuver. Second, the service bridge was subject to attack by ice, drift, derelict craft, etc., readily injuring and even destroying it. And third, it was found upon completion of Herr island dam and dam No. 6, neither of which has a wicket weir, that they are much easier to operate than Davis island dam and could be maneuvered at higher stages of the water. Nevertheless, each succeeding structure has been supplied with ample wicket weir facilities, with wickets in more than one instance longer and heavier than are the pass wickets of Herr island dam and dam No. 6, each of which are about 1 ft. longer than those in the pass at Davis island dam. In order to overcome the difficulty it was determined to operate the larger weir wickets by compressed air conducted through pipe lines constructed in dam foundations from power plants to abutments. Already operating winches for the purpose have been provided and are installed ready for experimental use at dam 2, where the longest weir wickets are placed, to be tested when conditions render such service necessary. Should they fail to operate satisfactorily after thorough trial it will not result in their abandonment. It has long since been suggested that such wickets should be made much shorter; say 6 to 8 ft. long, in order to induce their more frequent operation, the substructure underneath being a concrete fixed dam. This would naturally be the next step. However, first they will be thoroughly tried at several dams.

But probably to the general public the lock is always the most interesting feature of a slackwater system because it is the part with which they come in closest contact while passing along the stream. The Ohio river locks are among the largest in area in the world, being 110 ft. wide by 600 ft. long in their useful dimensions, and affording a safe navigable depth of 9 ft. over their lower gate sills, measured from normal surface of lower pools. Locks 1 and 6 are built of stone masonry. Nos. 2 to 5, inclusive, were originally constructed of concrete with stone facing on river exposure of river walls, and timber facing in lock chambers. As the timber decays, as it has in some instances, it is being replaced with concrete. At some locks the heavy stone coping has also been replaced with concrete.

RECENT CHANGES IN DESIGN.

In this connection it is worthy of attention that in recent years river construction works have undergone important changes. Formerly all locks, piers, and abutments were built of stone, and fixed dams of timber cribwork filled with broken stone, except an occasional stone masonry dam. Frequently also no great effort was made to secure deep foundations, the structures as far as possible being located on rock, even occaionally at considerable disadvantage to navigation interests. In recent years, however, all government structures are being built of concrete, where possible throughout, the concrete in this vicinity usually being composed of river gravel and sand and Portland cement. These structures are now almost invariably monolithic, the lighter members being reinforced with steel rods or beams. This method of construction is much less expensive than the old, besides being stronger and it is thought more durable. Another decided advantage is that its construction can be accomplished in much shorter time than stone masonry, and it is adaptable alike to foundation and superstructure purposes. Locations are determined with special reference to the needs and advantages of navigation, and if on gravel an equally good foundation is obtained by building the concrete structure on piles. Thus a stable structure in the main is secured; but steps must be taken to protect against scour by means of stone-filled cribs, piling, heavy riprap, etc.

GATES OF ROLLING TYPE.

The Ohio river lock gates are all of the rolling type, withdrawing into recesses extending into the banks back of the locks. The gates are drawn back and forth on tracks, much like railroad cars, by means of huge chains winding on grooved steel drums. The locks are filled and emptied of water in nearly every instance through large valves in the river walls. Sixteen so-called butterfly valves, each 4½ ft. in diameter, are located above the dams for filling the locks to the level of the upper pools, and 16 similar valves below the dams for emptying the locks to the level of the lower pools. These valves are operated directly from the power plants by oil pumps

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driven by compressed air generated by gas or steam driven compressors. In the more recent locks each valve is controlled by an individual oil cylinder, operating independently of all the rest. Compressed air also in nearly every case furnishes the motive power for operating the lock gates. In addition to the system of wall valves there is also a large number of valves in each lock gate available for filling and emptying locks by hand in the event of injury to the machinery operating the former, or when otherwise necessary. These are not often called upon since the wall system is rarely out of order. With such a simple lock system it is entirely practicable to conduct their entire operation from the power plants. This, however, is seldom done, every precaution being taken to guard against possible accident either to structure or vessels. While there is apparently little to get out of repair about a lock, what there is is of large dimensions and the greater part is under water and not easily accessible, requiring the services of a capable diver to examine minutely and repair. At least one such diver is employed in each operating force. Repairs under water are always difficult to perform, therefore extraordinary care is exercised to prevent breakages and to repair weakened parts before the injuries have become serious. Perhaps it may occur to some that the commercial movements on our rivers are comparatively small and the number of lockages and consequent movement of operating parts few, and therefore the occasion for injuries and breakages not very great. But therein they err. The local navigation is much more extensive than is generally supposed. The present season has admittedly been one of general business depression, yet in only a single month the number of lockages at Davis island dam alone exceeded 650, requiring each lock gate, which move only 110 ft. at a time, to travel in the aggregate more than 27 miles.

CAPACITY OF OHIO RIVER LOCKS.

An Ohio river lock will accommodate at one lockage a 1,000,horsepower towboat and 10 barges or coalboats, with perhaps a few smaller pieces, without breaking cargo or tow. In other words, from 10,000 to 12,000 tons of freight in addition to vessels transporting same can be passed at one time. Mishaps rarely occur considering that so great a weight coming in contact with a lock gate would surely destroy or seriously injure it. It is unfortunate that the passage of the smallest motor boat or skiff should necessitate practically the same work by the operating machinery and lock force as does the locking of a fleet of loaded boats taxing the capacity of the lock to its utmost. This condition has suggested the advisability of introducing some auxiliary device especially for the disposition of very small craft at times when their independent passage becomes necessary. As river business increases, which is certain as the slackwater system is extended down the Ohio, the adoption of some such measure is not improbable.

Compared with the locks, the dams, although very strongly built, are subject to more frequent breakages. Seldom is a dam raised but it is found necessary to repair or replace some broken or injured wickets, horses, horse boxes, or props; not that they are so easily injured, but because they are of necessity subjected to unusually rough usage, both in raising and lowering. Their repairs are always made by a diver, extra parts being kept in stock for their accomplishment. If not too badly injured the broken parts, when it is possible to recover them, are repaired by the lock forces. The dams are so designed and constructed as to render the replacing of broken parts a short operation to those perfectly familiar with their details. An unfortunate feature of such repairs is that they cannot practically be made until the stage of water has receded to approximately the proper elevation for raising the dam, nor expeditiously without first raising it out to the injured part in order to break the current from the diver and to hold in a steady position the necessary repair boats. Accordingly, when repairs of such nature are extensive, slight delay is likely to occur at a time when it is desirable to have the dam up. This, however, cannot well be avoided, and must be charged up as one of the objectionable features of movable dams. Fortunately such occurrences are neither frequent nor as a rule of sufficient moment to justify serious complaint.

NATURE OF PERSONNEL.

From the foregoing it will appear evident that the operating forces on such structures must be men of no mean ability as general rivermen, mechanics, machinists, carpenters, heavy blacksmiths, enginemen, general construction men, in short men capable of turning their hands to almost anything along the line of work pertaining to the operation and maintenance of such works. They must be competent to tear down any part of the structure, either above or under water, and rebuild it of a similar or different construction, if need be. They must be able to foresee what is likely to occur under the ever varying conditions of the river, in order to meet the exigencies of the case. But above all they must be absolutely fearless as concerns water, machinery and navigation. It is true all these qualifications are more nearly required in the lockmaster than in the remainder of the force. But some of them are essential requirements in each member of the crew in order that an intelligent and capable organization may be maintained. The lockmaster is in direct charge of the entire plant. When it is taken into consideration that, in round numbers, the cost of a lock, dam and operating plant is $1,000,000, and in addition thereto the safe handling of millions of dollars' worth of vessels and their no less valuable cargoes are entrusted to him, the responsibility of that position must not be lightly regarded. Subordinate to him are the dam-tender, in charge of the actual raising and lowering of the dam and keeping of it in repair, the engineman operating the power plant, a second engineman in charge of the maneuvering boat machinery, and about a dozen lockmen. All lockmen are immediately broken in as enginemen to operate the lock and power plant, are trained to maneuver wickets, to run the maneuvering boat engines, and perform the various minor duties peculiar to movable dam operations. Their duties are by no means simple, however they may appear to the casual observer. When a lockman finds himself alone after midnight in charge of the entire plant with one steamboat after another presenting themselves and tows or cargoes for lockage, he cannot but realize that a great responsibility has been placed upon him. Mr. E. H. Harding, with headquarters at Davis island dam, is the superintendent of all movable dams in the Pittsburg district, with whom the lockmasters confer continually concerning the details of operations.

Aside from the immediate maneuvers and operations of the dams there is another and perhaps more important feature of their operation, devolving directly upon the superintendent and engineer in local charge. It pertains to the establishment of and release of the slackwater pools,—the determination of the exact times

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when the dams are to be raised, and more especially when they are to be lowered. This involves a careful study of the meteorological conditions, the water fluctuations, ice conditions, navigation needs, etc. In this locality of continually varying water, rainfall and snow-melting combinations it is exceedingly difficult to forecast future river conditions often even only a day ahead, and the best of prognosticators are frequently at a loss to foretell the next day's probable river stage. Chanoine wicket dams were specially intended for such precise manipulation as to gradually transform pool to open river conditions, and vice versa, but with the erratic weather and river changes prevalent in this region this has been found a very difficult thing to accomplish. No established rule has been developed, and each freshet must be studied and worked out on its own merits, and the dams maneuvered accordingly.

Few indeed are the communities in this land that can boast of a more extensive and efficient local artificial navigation than Pittsburg, reaching out in every direction and knitting together its various industries and interests. But the full measure of its benefits can never be realized, nor can the great industrial center at the head of the Ohio valley reach the zenith of its development until the mighty stream traversing that valley has been made permanently navigable to its mouth.

THE BRITISH ENGINEERING COMBINE.

There are indications that the proposed combination of marine engineering firms on the North East coast which has been considered during the past three months has had to be abandoned owing to many difficulties as to terms. The number of engineering firms agreeable to enter the combine has dwindled down to some seven or eight, located on the Tyne, Wear and Tees, owing to disagreement as to valuation and capitalizations, general working capacity and output, all of which have, it is said, made the proposal virtually impossible of realization in its original form.

BATTLESHIP NORTH DAKOTA.

The photographs published herewith show the battleship North Dakota, building at the Fore River Yard, 67.4 per cent completed. The photos were taken on Jan. 1.

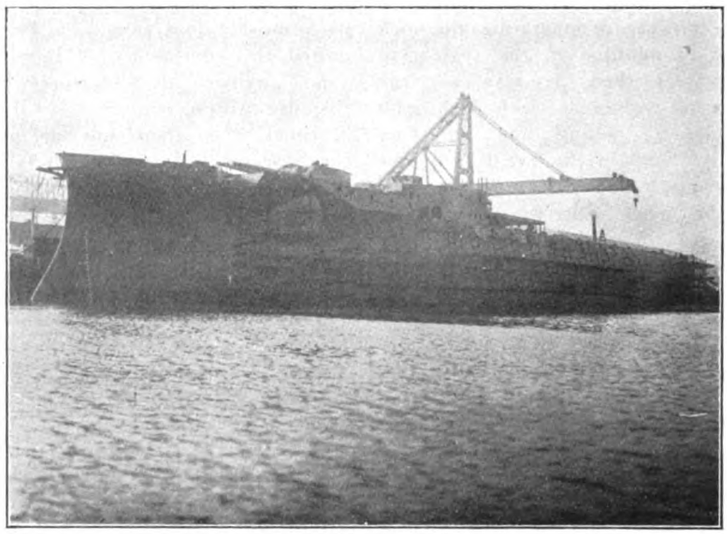
ITEMS OF GENERAL INTEREST.

The monitor Cheyenne, formerly the Wyoming, after having been out of commission for three years, has left the Mare Island navy yard for southern California, where she will undergo trials to test her oil burning apparatus.

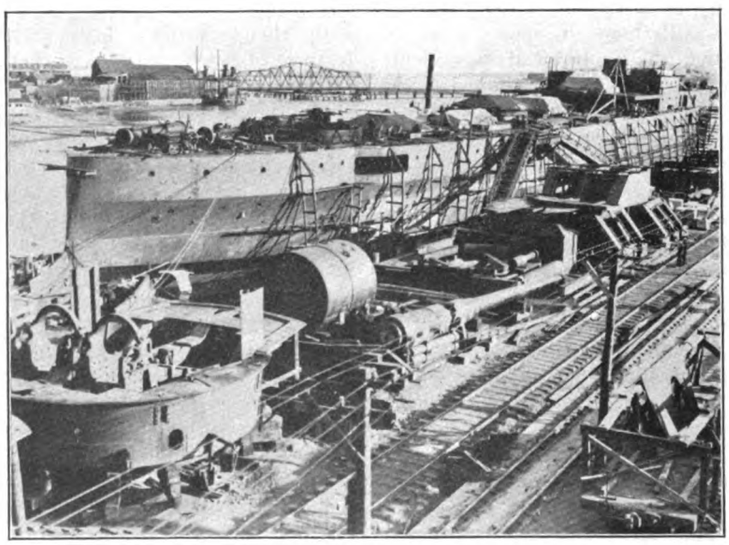
A tender of $250,000 has been made to the Chandler-Dunbar Co. for land owned by them that is required in the construction of the new lock and canal at the Sault and has been accepted by them, but we are advised by Lieut. Col. Townsend that the matter has not yet received the approval of the war department.

The equipment of the Eastern Ship Building Co.'s plant at New London, Conn., was sold at auction during the last week in December. The leading coast ship yards were liberal purchasers. Bidders were present from Jacksonville, Fla., middle Canada, and from upper Maine to the Mississippi river. The first day 762 lots were sold in about three hours, the second day 582 lots of equipment, buildings, wharves, engines, piping and electrical appliances were sold in three hours and fifty minutes. The third and last day 860 lots were sold by 2 o'clock.

If the mail subsidy bill, which is now before the Cortes of Spain, should pass, which is regarded as very probable, the Spanish trans-Atlantic line will at once build steamships which will compare favorably with the finest



BATTLESHIP NORTH DAKOTA SHOWING HER 67.4 PER CENT COMPLETED.



BATTLESHIP NORTH DAKOTA SHOWING HER 67.4 PER CENT COMPLETED.

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liners afloat in size, speed and equipment, according to Senor Emilio Tomassi, general agent of that line at New York. Senor Tomassi has just returned from Cadiz and says that his company, in the event stated, will establish a direct line from Cadiz to New York weekly. He predicts that should the bill pass, Spain will in a very few years develop a great merchant marine.

The shipping companies with headquarters at Montreal distributed $50,000 as a bonus to longshoremen for regular work during the season just closed. The average bonus paid each man was $30.

United States light vessel No. 89, built for the lighthouse board, has been supplied with Webb perfection galley ranges by Elisha Webb & Son Co., 161 South Front street, Philadelphia, Pa.

The steamer Two Myrtles has been purchased by the lighthouse service from John Johnson, of Green Bay, and the National Co-operation Commission Co. of Maine, each owning one-half interest.

The Northwestern Expansion Metal Co., 930-950 Old Colony Bldg., Chicago, has just issued a little catalog on floor slabs. It contains a great deal of information on concrete and will be sent to any one interested.

Crawford & Reid, Tacoma, Wash., and E. W. Heath, of the same city, have each been awarded a contract by the Tacoma Tug & Barge Co. for the construction of duplicate barges. The craft are to be 83 ft. long, 30 ft. beam and 7 ft. deep.

The United States Civil Service Commission will hold an examination Feb. 3 and 4 for the position of local inspector of hulls of steam vessels at Galveston, Texas. Application for forms should be made to the commissioner at Washington. The applicant can be examined by mail.

The report of chief of engineers William L. Marshall, recently forwarded to the house, states in regard to the improvement of the East River, New York, at Middle Ground, between the Battery and Baretta Point, that a 26-ft. channel is needed in this section. The estimated cost is fixed at $1,773,000.

The Matson Navigation Co. and the American-Hawaiian line are believed to be about to enter upon a lively rate war for traffic between Puget Sound and the Hawaiian Islands. The Matson Navigation Co. chartered the steamer Hyades, owned by the Boston Towboat Co., and announced that, should business warrant, it would also charter the sister ship, Pleiades. The American-Hawaiian line forestalled this possibility by at once securing a charter of the Pleiades and will operate her in connection with its other steamers, of which the company has a large fleet. The Hyades and Pleiades are to be equipped with oil-burning apparatus before taking up their new duties, and it is stated that the charterers of the Pleiades intend to alter her machinery to give her more speed.

Surgeon C. F. Stokes, who was appointed by President Roosevelt to the command of the hospital ship Relief against the vigorous protest of naval officers, has been detached from the navy and has returned to this country. He left the Relief at Manila in charge of Sailing Master Locain. Surgeon Stokes was detached from the Relief at his own request.

There is speculation as to who will succeed Hon. T. E. Burton as chairman of the committee on rivers and harbors upon his election to the United States senate. Representative Alexander, of New York, is the ranking member, but he is likely to be placed upon the judiciary committee, which would leave Representative George P. Lawrence as the ranking member on the present rivers and harbors committee.

The standardization tests of the scout cruiser Salem were concluded on the Maine course Dec. 15. The cruiser made her fastest mile at 25.03 knots, attaining an average speed on her three top speed runs of 24.9. The three cruisers Chester, Birmingham and Salem will undergo an ocean trial during February. They will run at top speed for 24 hours, at 20 knots for 100 hours, at 15 knots for 50 hours, and at 10 knots for 100 hours.

Irving B. Dudley, United States ambassador to Brazil, arrived at Boston last week on the steamship Cretic, on which he is to go to Europe for a vacation. He says that he has been assured by Senator Perkins, of California, that the government will shortly agree to subsidize a steamship line between this port and Brazil, for a direct service. He also believes that there soon will be cable connection between this country and Brazil, the absence of which has been a great drawback to the country south.

Attorneys of the Legal Aid Society of New York have recently conducted an investigation with regard to compliance with the federal law which went into effect on July 1, 1908, requiring that every scow or towboat in New York harbor should be provided with life lines and life buoys, and that a list of the men employed should be kept by the owner. The investigation has shown that there is not even a half-hearted attempt to carry out this law. Even the boats owned by the department of street cleaning of the city of New York are not fitted with any of the appliances required and no record is kept of the men who go to sea on these insecure craft. The department states that it is unable to conform to the law as its appropriations are exhausted. It is alleged that some government official has told the owners that the law would not be enforced prior to March 8 and that the present session of congress would amend the statute.

The British whaler Nimrod has left Christchurch, New Zealand, for the south pole, carrying the expedition headed by Lieut. Shackleton, of the British navy. Lieut. Shackleton contemplates making the dash for the pole in a specially-constructed automobile which has many unique features demanded by the ice conditions. The car is estimated to be capable of making 25 miles per day.

Rear Admiral Robley D. Evans, who recently retired from the United States navy under the age limit, has been made chairman of the board of directors of the Los Angeles harbor commission and will enter upon the duties of the position at the close of his lecture tour. Some of the admirers of the naval veteran started a movement to present him with a residence in Los Angeles, but Admiral Evans, upon hearing of the project, declined to allow it to proceed.

The surveyors of the New York state engineer's force are now working upon a survey of land in the northern part of Warren county where it is proposed to erect an immense storage reservoir from which to supply water to the new barge canal during drouths. The site proposed will cover the villages of Chestertown, Horicon and South Horicon, and will necessitate the removal of hundreds of houses should the reservoir be constructed there.

Senator Hale, of the naval affairs committee, has introduced a resolution which provides for a complete investigation of the navy department and its methods. The resolution was passed without debate and marks the first step in preparing an answer to the allegations contained in the story by George Kibbs Turner, in the current issue of *McClure's* magazine. This attack, which promises to attract as much attention as the now famous Reuterdahl criticisms, deals particu-

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larly with naval expenditures. What bearing the investigation by the senate will have upon the results of the conference called by President Roosevelt for investigating the navy department remains to be seen.

President Roosevelt has sent a message to congress in which he recommends immediate legislation requiring that within reasonable limitation ocean-going steamships carrying considerable numbers of passengers carry efficient wireless telegraph equipment.

Capt. Pritchard, of the Cunard liner Mauretania, which has just recently resumed her service after having new propellers fitted, is quoted as saying "there are 28 knots in this boat and I propose to get them out of her."

It is noted with interest by those who follow naval affairs that Commander Robert B. Higgins, at present attached to the New York navy yard, has decided to apply for a transfer from the line to the bureau of construction and repair.

The Moran Co., Seattle, Wash., expect soon to complete arrangements for building the submarines which are to be constructed at this yard.

The report recently circulated in the newspapers that the Great Northern liner Minnesota was to be transferred from American register to British register is denied by the Great Northern Steamship Co.

Commander A. L. Key, who was in charge of the scout cruiser Salem at the time of the recent accident to her machinery, has been called upon to furnish an explanation concerning the mishap. The Salem was on her way to Havanna for the purpose of conveying Governor Magoon to Knight's Key, Fla., but on the run down the coast the machinery broke down and she was compelled to put into Charleston for repairs.

At a banquet of the Peace and Arbitration League of New York recently, Senator James B. McCreary, of Kentucky, was the guest of honor and the principal speaker. In his address he outlined the program of the Peace and Arbitration League and laid particular stress upon the clause which provides for the maintenance of a navy larger in power of resistance than that which any nation can detail from home waters and send against this country.

Secretary of Commerce and Labor Straus has approved the regulations to take effect Feb. 1 next, prescribing that tows of sea-going barges navigating the inland waters of the United States shall not exceed four vessels tandem, including the towing vessel, while the hawsers between them shall not exceed 75 fathoms. In consequence tows cannot exceed about 2,000 ft. from the bow of the towing steamer to the stern of the last barge in tow. The regulations also prescribe that in entering or leaving harbors the barges must be bunched so as to reduce the length.

The Merchants' & Miners' Transportation Co. is soon to start a line of steamships between Jacksonville, Fla., and Savannah, Ga. These ports have been without regular water communication for several years, although a decided demand has existed for a combined freight and passenger service. There are to be three boats a week and they will run from Baltimore to Savannah, continuing to Jacksonville.

Secretary of the Navy Newberry recently sent a report to congress stating that it cost $109,856 to keep a first-class battleship in repair and good condition for one year. This figure does not include extraordinary repairs incident to taking a ship out of commission, remodelling or reconstructing it. The cost of coal used on battleships for the fiscal year 1908 was $3,163,902 and this amount was increased by the transportation and storage charges to $5,544,945.

The Toyo Kishen Kaisha's trans-Pacific service is to be augmented by the addition of a third steamship to be called the Kanyu Maru, which is now under construction and is to be ready for service by the end of the present year. She is to be similar to the Tenyo Maru and Chiyo Maru. The Osaka Shosen Kaisha is is now arranging for a loan of a million and a half dollars to complete the steamships for its trans-Pacific service in conjunction with the Chicago, Milwaukee & St. Paul Railway.

The United States and Great Britain have reached an understanding concerning the Newfoundland fisheries dispute, which is to be submitted to The Hague for settlement. The tentative agreement, signed by Secretary of State Root and the Right Hon. James Bryce, ambassador to the United States, contemplates the interpretation by The Hague corurt of Article 1 of the treaty of 1818 for an exact definition of the treaty rights of American fishermen.

The Richelieu & Ontario Navigation Co., Montreal, Can., which operates lines of steamers on Lake Ontario and on the St. Lawrence and Saguenay rivers, passed through the season of 1908 with a decrease of only $63,220 in gross earnings and a gain in net surplus of $9,000. In its annual statement for the year ended Dec. 31, 1908, the company shows that after paying out $156,600 in dividends, the net surplus remaining was $35,305, the largest in ten years. Gross earnings for 1908 amounted to $1,241,748, which though less than for the previous year, is well above the average for the last ten years.

Cable advices from Yokohama give an interesting account of the enormous sums of money advanced to Japanese shipping. Since 1897 the Nippon Yusen Kaisha has alone received over $25,000,000. Adding the grants that were made to the company in the earlier stages of its organization, the total reaches $40,000,000. The Nippon Yusen Kaisha has a fleet of 94 vessels, built or building, with a total tonnage of 349,869. It is now proposed to increase these subsidies by $1,500,000 per annum.

The net earnings of the Eastern Steamship Co. for the fiscal year ended Dec. 31 last are reported to have been slightly in excess of $500,000, an amount sufficient to meet interest and sinking fund charges and leave a balance equal to seven per cent on the $3,000,000 stock. This compares with earnings for the stock in 1907 of about 5 per cent and in 1906 of 8.9 per cent. The gross earnings of the past year were somewhat less than in 1907, but the management introduced some radical operating economies, with the result that the net earnings for the year showed a substantial increase.

Fields S. Pendleton, president of the Atlantic Carriers' Association, is authority for the statement that the building of the derelict destroyer Seneca by the federal government and the systematic searching for abandoned and disabled vessels, constitutes the first real help that the United States government has extended to the sailing craft interests of the Atlantic seaboard. Mr. Pendleton is one of the owners of the schooner Wm. J. Lermond, which was abandoned off Cape Hatteras on Christmas day. She was picked up by the revenue cutter Onondaga and towed to Norfolk. Meanwhile the derelict destroyer Seneca had picked up the abandoned schooner Warner Moore and towed her to a point of safety. Ordinarily both of these vessels would have been the legitimate prey of wreckers, or would have drifted about for weeks, a menace to all coastwise vessels. The federal government charges nothing for this work of salving. The federal government, therefore, protects coastwise shipping in two ways. It protects it from competition and it protects it from excessive charges for salvage.

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PACIFIC COAST NOTES.

Office of the MARINE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Feb. 13.

The Chicago, Milwaukee & St. Paul Ry. has let the contract for the construction of two car ferries to Hall Brothers Marine Ry. & Shipbuilding Co., Winslow, Wash. The price was not made public. Several Pacific coast firms bid on the work, including the Moran Co., and Philip D. Sloan. The ferries are to be each 191 ft. long, 42 ft. beam and 11 ft. deep. They will have a small house for the crew and will be handled by tugs. Each ferry will have a capacity of 12 cars. The vessels must be completed by June 15.

The Norwegian steamer Cecil arrived at Tacoma Feb. 3 in a very unseaworthy condition. Many of her plates on the bottom were sprung, she was leaking badly and her machinery was shifted. The Cecil ran ashore on the southern extremity of Santa Margarita Island on the lower California coast, Jan. 12, and after being pounded in the breakers for 32 hours was pulled off by the Pacific Coast Co's steamer Curocoa. The Cecil is 6,040 tons gross, was built at Newcastle-on-Tyne and hails from Bergen, Norway. She will be docked and repaired on Puget Sound.

The contract for repairs to the steamship Admiral Sampson, recently bought on the Atlantic by the Alaska-Pacific Steamship Co. has been awarded to the Risdon Iron Works, San Francisco. The specifications call for converting the vessel into an oil burner and also for making alterations in her accommodations. The work will cost approximately $75,000 and is to be finished in 45 days.

The St. John Shipbuilding Co., St. John (Portland) Ore., recently launched the new Columbia river ferry City of Vancouver. The new ferry cost $30,000 and will be ready for service in sixty days. It will replace the old ferry operating between St. John and Vancouver, Wash., in connection with the Portland Railway, Light & Power Co.'s electric line. The new ferry was christened by Miss Velma Phillips, and the launching was attended by over 1,000 people. It was one of the most auspicious affairs of its kind ever held in Portland.

Repairs to the extent of $20,000 will be made on the steam schooner A. G. Lindsay at Grays Harbor, Wash. The Lindsay will be fitted with two new boilers and will have the house altered so as to accommodate 15 passengers. The work will require about five weeks, after which the steamer will return to Seattle to resume her run between Seattle, Valdez and Seward, Alaska.

Two unknown sailing ships are ashore about five miles northwest of the outside beach at False Cove, Cape Horn. One vessel is a three master and her mizzen mast is gone. The other is a four master and is apparently uninjured.

The bill which recently passed the senate appropriating $140,000 for additional lights and aids to navigation along the Alaska coast has been offered as an amendment to the sundry civil appropriation bill and will thus escape the usual delays incident to an individual bill. Pacific coast shipping interests are anxious to have the measure passed.

The bark Fort George is 196 days out from New York to Honolulu and it is feared that she is lost. One of the two vessels sighted at False cove, Cape Horn, may be the Fort George, but this point has not been determined.

J. B. C. Lockwood, chief engineer, Port of Portland, advises that the plans and specifications for the new steel bar and river tugs, described in the MARINE REVIEW, Dec. 17, 1908, have been nearly completed and that advertisements for bids will be issued in a short time. It is expected to construct two steel screw tugs 150 ft. long, one steel screw tug 120 ft. long and one steel, stern wheel river tug 195 ft. in length. The estimated cost of the tugs is $350,000.

In eight hours, Feb. 2, 1,193 tons of coal were discharged from the British steamer Kish at the navy yard, Puget Sound. This is believed to be the record for fast unloading on the Pacific coast. The work was done by two gangs of stevedores employed by Rothschild & Co. This concern has a contract for discharging 25,000 tons of coal at the navy yard.

The steamer St. Croix, purchased at Fall River, Mass., by Schubach & Hamilton, Seattle, is reported to have left Newport News, Va., Feb. 4, on her long voyage around Cape Horn to Seattle. The St. Croix has been chartered on time by the Alaska Coast Co. to run between Seattle, Valdez, Seward and Kodiak. She is expected to arrive on Puget Sound in 50 days; $50,000 has been spent on the St. Croix since her purchase and she will be one of the best equipped vessls in the Pacific passenger trade. The latest ideas adopted on the Atlantic steamers have been followed. The time-honored captain's table has been abolished and the passengers will dine at small round tables, each accommodating five persons.

The steamer Skeena, operating on the Skeena river from Prince Rupert, B. C., is undergoing extensive repairs at Prince Rupert. The Skeena is owned by Foley, Welch & Stewart. It was found that she did not back well in the swift water of the river where it is often necessary to steam stern first, so her stern lines are being altered. When these alterations are completed her engines will be taken out and replaced with new ones of 260 H. P. The old engines were 200 H. P. The work is being done by George Askew, Victoria, B. C. It is expected to have the steamer again ready for service when the ice breaks up March 1.

An arrangement between the International Steamship Co., of Seattle, and the Union Steamship Co. and the firm of McKenzie Brothers, both of Vancouver, B. C., has resulted in the sale of through tickets between Seattle and Prince Rupert, creating a line in opposition to the Canadian Pacific Steamship Co. The through service will be twice a week. There will be three classes of tickets sold, first, second and third, and the rates will be $15, $11 and $7. The Canadian Pacific announces that its regular rate of $18 will be maintained. The establishment of the new line is significant as another phase of the big rate war that has been waged between the International Steamship Co. and the Canadian Pacific for nearly a year.

The Boston Steamship Co.'s 10,000-ton liner, Tremont, which has been sold to the government, cleared from Seattle for New York, Feb. 2. Capt. Thomas W. Garlick commands the Tremont. He expects to arrive in New York April 1. The Tremont went out loaded with 5,000 tons of bunker coal and 92,904 cases of canned salmon. This is the second largest cargo of salmon that has left Seattle this season. The departure of the big steamer is another incident in the sad disappearance of the American merchant marine from the high seas.

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MARINE INSPECTION SERVICE BILL.

Elsewhere in this issue will be found the text of the Marine Inspection Service bill in all of its essential details. A great point of interest alike to vessel owners and the crew aft is the provision for three watches in the engineers' department on all runs of over forty-eight hours' duration. This presumably includes the lakes on certain runs, though it is probably intended to apply to ocean-going runs where the ship is actually in the open sea over 48 hours.

There is also a provision of great interest to the forward crew which provides that it will be unlawful for the master of a seagoing vessel to permit an officer to take charge of the deck watch immediately after leaving port who has not had at least four hours off duty before taking such watch. This would relieve the mate of watch duty when leaving port, if his time has been consumed in supervising loading and unloading operations in port. At any rate, these provisions are now undergoing voluminous discussion by masters, mates and engineers. Naturally both ends of the ship look at the matter from their own point of view. Among the communications submitted to the Marine Inspection Commission was one from a lake member of the Marine Engineers' Beneficial Association protesting against the present six-hour watch. It was represented that at such a port as Gary, for instance, where a 10,000-ton ship may enter and discharge her cargo in six hours, the engineer can spend all his time cleaning boilers and then stand his watch as the steamer leaves port, probably carrying steam in only one boiler while the other is undergoing finishing cleaning touches. It is claimed that the fact that the larger class of vessels now carry three engineers does not relieve the situation any, as the engineers below the rank of chief represent that the chief has simply taken advantage of the third engineer to ease his own labors. On the other hand, lake masters, while admitting that the mate frequently has long stretches of fatiguing labor to perform, are frank to confess that they do not see how the engine-room force can be overworked. They point to the fact that in running the rivers the master is continuously on duty. If a steamer has a tow it takes about eighteen hours to go from Bar Point to Port Huron, during which time the master is standing continuous watch, while the engine-room force is enjoying its regular periods of rest. Again, in fog which may last for days together, the master is continually on watch while his ship is in motion. During this period the engine-room force can observe its regular habits. In other words they claim that it is only while in port that the hours of the engine-room force may be encroached upon, while they may be encroached upon at all times forward.

There are many, many provisions of the bill that will have to be amended or stricken out before it becomes a sensible measure. Undoubtedly time will be given to the many interests affected to discuss the provisions of the bill in committee. If passed in its present form it will do more mischief than good. It would certainly demoralize the motorboat industry.

OCEAN MAIL BILL.

The amendment to the Ocean Mail Act of 1891 is now pending in the house committee on post roads and post offices in the form in which it passed the senate on March 20th last. There is some talk of adding the bill to the post office appropriation bill during the present session. If passed there is no doubt whatever that it will give a great impetus to the revival of industry in this country as it will call for the immediate construction of a number of ocean-going steamers. The amendment as it passed the senate is as follows:

AN ACT

To amend the act of March third, eighteen hundred and ninety-one, entitled "An act to provide for ocean mail service between the United States and foreign ports and to promote commerce."

Be it enacted by the senate and house of representatives of the United States of America in congress assembled, That the postmaster-general is hereby authorized to pay for ocean-mail service under the act of March third, eighteen hundred and ninety-one, in vessels of the second class on routes to South America, to the Philippines, to Japan, to China and to Australasia, four thousand miles or more in length, outward voyage, at a rate per mile not exceeding the rate applicable to vessels of the first class as provided in said act, and in vessels of the third class on said routes, at a rate per mile not exceeding the rate applicable to vessels of the second class, as provided in said act: Provided, That if no contract is made under the provisions of this act for a line of ships between a port on the Atlantic coast south of Cape Charles and South American ports, the postmaster-general shall, provided two or more lines are established from North Atlantic ports, require that one of said lines shall, upon each outward and homeward voyage, touch at at least two ports on the Atlantic coast

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south of Cape Charles, regard being had in the selection of such ports of call to geographical location and to the volume of the export and import business of the ports so selected: Provided, further, That the total expenditure for foreign mail service in any one year shall not exceed the estimated revenue therefrom for that year.

LAKE FREIGHT SITUATION.

Carrying charges for ore have been fixed at last year's figures, that is to say, 65 cents from the head of the lakes, 60 cents from Marquette and 50 cents from Escanaba. Some tonnage had been tied up at these figures earlier in the year, though later there was talk of cutting the rate to 60 cents. Leading shippers, however, were not desirous of making the cut, being quite willing to pay last season's carrying charges, considering the fact that operating expenses remain the same. In fact, the rate would not have been cut last year had vessel interests maintained a united front. However, some who were more anxious than others to get business cut the rate 10 cents. It is doubtful now considering the growth of ships and the great stability that is marking the trade if the rate will ever again be 75 cents. There is a fair return to be derived from the trade at 65 cents by the larger class of carriers, provided they are kept busy throughout the season and have reasonable dispatch, but the smaller carriers have great difficulty in breaking even. Few sales of ore are being made and the date of opening is uncertain.

CONTRACT FOR PACKAGE FREIGHTER.

The Anchor Line has closed contract with the American Ship Building Co. for a package freighter, to be a duplicate of the Wissahickon. This new package freight steamer will be 350 ft. keel (372 ft. over all), 46 ft. beam, 30 ft. depth of hold. On 18 ft. 8½ in. should carry, provided it can secure the proper amount of heavy freight, say 5,200 tons. Steamer will be equipped with quadruple-expansion engines, diameter of cylinders 19, 27½, 40, 58; length of stroke, 42 in.; three boilers, diameter of each boiler 11 ft. 6 in.; length, 11 ft. 6 in.; allowed 210 lbs. of steam; total, 4,693 sq. ft. of heating surface; one propeller wheel 14 ft. in diameter, 16 ft. pitch. Average speed when loaded, 13 miles. She is to come out next August.

PIG IRON SITUATION.

Recent reports of price cutting, some of which have been exaggerated, have had a depressing effect on the market. The situation as reported last week is unchanged, and no action looking toward a general reduction in prices has been taken. Some fair railroad business has developed. The first steel was made at the great Gary plant this week, three open hearth furnaces having been started Monday. The pig iron market is dull, and southern furnaces are still holding to $13 Birmingham for No. 2. There is some demand for pipe and shapes. The scrap market is dull, and prices are lower in various large centers. Coke is weak, and efforts to reduce production have had little effect.

DOMINION MARINE ASSOCIATION.

The annual meeting of the Dominion Marine Association was held at Ottawa, Feb. 11. G. A. Tomlinson of Duluth and W. H. Smith of the Canada-Atlantic Transit Co. of Montreal attended the meeting as representatives of the Lake Carriers' Association. The new grain bill of lading was adopted which provides that: "The vessel carrying shall not be responsible for shortage exceeding one-half bushel for every thousand bushels carried, the vessel to deliver all grain on board, collect freight upon actual outturn and make no claim for any overrun."

A resolution was adopted condemning the power development of navigable streams to the detriment of navigation interests, the river St. Lawrence being especially referred to. Protest was also made against the admission of foreign vessels to the coasting trade of the dominion.

Officers for 1909 were elected as follows: President, C. J. Smith of the Richelieu & Ontario Navigation Co., Montreal; vice-presidents, H. H. Gildersleeve of the Northern Navigation Co., Collingwood, and F. Plummer of the Canadian Lake & Ocean Navigation Co., Toronto; general counsel, Francis King, Kingston.

OBITUARY.

Lieut. W. J. Wilson, nautical expert, in charge of the government hydrograhic office in Chicago, died at his home, 536 West Sixty-sixth street, Chicago, quite suddenly on Monday, Feb. 15. He was well regarded by vessel interests in general and many masters owe much to his instruction. He projected the Chicago Nautical School for their benefit during the winter months. These classes will be continued throughout the present season by his assistant, Mr. Frank T. Clarke.

Lieut. Wilson was born in Cincinnati, Oct. 14, 1858, and was graduated from the Annapolis Naval Academy in 1883. He was on sea duty for three or four years. In 1893 he co-operated with the government engineers in the construction and laying out of the World's Fair at Chicago. As a result of the exhibition made by the government at the fair a branch hydrographic office was established at Chicago and Lieut. Wilson placed in charge of it. He continued in charge until his death. He was a captain in the Illinois Naval Reserve both before and after the Spanish-American war. During the period of hostilities he was commissioned lieutenant of the navy. He was a member of Camp Logan, Spanish-American War Veterans; secretary of the Chicago-Annapolis Alumni Association; member of the Naval Order of the United States; member of the Chicago Athletic Club and honorary member Jackson Park Yacht Club. Lieut. Wilson had written quite extensively for magazines and periodicals and was the author of the Masters' Manual which is generally used aboard ship. He was buried with the military honors.

The bulk freighter Eugene J. Buffington, the second of the 600 footers building for the Pittsburg Steamship Co. will be launched at the Lorain yard of the American Ship Building Co. on Saturday, Feb. 27.

The United States engineer at Buffalo is taking steps to have a new entrance channel dredged into that harbor with a minimum depth of 21 ft. It is requested that at the opening of the season masters entering Buffalo use the new channel in order that opportunity may be given to clear out the obstruction in the old entrance at the north end of the breakwater.

At the regular meeting of the Ship Masters' Association last week Captains Joseph Bourassa, Merton G. Allen and John A. Logan were elected active members and C. C. Lauken was made an associate member. The members of Cleveland lodge have been notified that after May 1 the age limit for prospective members at the time of initiation will be 45 years instead of 50 years. The initiation fee will be increased from $5 to $15.

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Marine Inspection Service Bill.

The bill submitted by the marine commission appointed by the president last May and briefly referred to in last week's REVIEW, repeals sections 4399 to 4500, inclusive, relating to the steamboat inspection service. It is a very sweeping measure and will doubtless be subjected to lengthy discussion and numerous amendments before it is passed. Some of its provisions relating to motor boats are absurd. The measure is very long, so that only its salient features can be discussed in an article of this character.

The bill provides for the creation of eight examining boards to examine and license officers of the merchant marine and to try cases of misconduct. The purpose of this is to relieve the inspectors of a great deal of work which they now perform outside of the regular inspection of vessels. A moment's consideration, however, will show how impractical this rule is. The trials are now conducted by 46 local boards and it is absolutely necessary that everyone should be given a speedy trial as a licensed officer under charges cannot follow his calling. He is as helpless to provide for himself and family as though he were in jail. As the steamboat inspection service extends from Maine to California and from Porto Rico to Hawaii, the eight boards would have to travel furiously to attend to all cases.

When it comes to the regulation of motor boats, the bill becomes simply absurd. Motor boats are required under penalty of $1,000 to have at least one substantial life boat aboard. Everyone knows that the ordinary life boat is larger than a great many motor boats. Moreover, it is provided that motor boats with passengers more than 40 miles off shore must be equipped with an efficient wireless apparatus. It will be seen that the commission is endeavoring to apply to motor boats, thousands of which are only 15 ft. long, the same regulations as are employed in the inspection of ocean-going steamers. These provisions could not be made effective without a numerous water police force as there are already 20,000 motor boats carrying passengers for hire, and the number is rapidly growing.

The absurdity of some of the provisions of the bill have been clearly pointed out by a dissenting report by Eugene Tyler Chamberlain, commissioner of navigation. The motor boat industry is growing with great rapidity and is affording economical and harmless pleasure to thousands if citizens. It would be a great pity if the industry should now be crippled or even halted by unwise legislation.

The bill regulates all steam vessels and all motor vessels measuring 35 ft. or over between perpendiculars; all steam vessels and all motor vessels carrying passengers for hire; all sail vessels of 300 gross tons or over; all sail vessels of 50 gross tons or over carrying passengers for hire; all barges and vessels not otherwise specified of 50 gross tons or over carrying passengers for hire; all sea-going barges of 100 gross tons or over. Every vessel propelled in whole or in part by steam is deemed a steam vessel. Every vessel not a steam vessel propelled in whole or in part by machinery is deemed a motor vessel. Both hull and machinery of all these vessels are to be inspected annually by the local board of inspectors. The provisions reparding construction of boilers are as follows:

"Sec. 20.—*Inspection of boilers.*—Every boiler manufactured of iron or steel plates to be used in any vessel subject to inspection shall be constructed of plates that have been inspected and stamped in accordance with the provisions of this act.

"Sec. 21.—*Penalty for improper construction.*—Every person who constructs a boiler, or pipe connecting the boilers, to be used on vessels subject to inspection, of iron or steel plates which have not been duly stamped and inspected according to the provisions of this act, or who knowingly uses any defective, bad, or faulty iron or steel in the construction of such boilers, or who drifts any rivet hole to make it come fair; or who delivers any such boiler for use, knowing it to be imperfect in any of its parts, shall be fined one thousand dollars. Nothing in this act shall be so construed as to prevent the use on any vessel of any boiler or steam generator which may not be constructed of riveted iron or steel plates when the board of supervising inspectors have satisfactory evidence that such boiler or steam generator is equal in strength and as safe from explosion as a boiler of the best quality constructed of riveted iron or steel plates: *Provided, however*, That the inspector-general may grant permission to use any boiler or steam generator not constructed of riveted iron or steel plates upon the certificate of the supervising inspector for the district wherein such boiler or generator is to be used and other satisfactory proof that the use of the same is safe and efficient; said permit to be valid until the next regular meeting of the supervising inspectors, who shall act thereon.

"Sec. 22. *Inspection of boiler plates.*—Every iron or steel plate used in the construction of marine boilers, and subject to a tensile strain, shall be inspected and tested in such manner as shall be prescribed by the board of supervising inspectors and approved by the secretary of commerce and labor, so as to enable the inspectors to ascertain its physical properties; and no iron or steel plate shall be used in the construction of such boilers which has not been inspected and approved under those rules.

"And the inspector general may, under the direction of the secretary of commerce and labor, detail assistant inspectors of machinery to inspect iron or steel boiler plates at the mills where the same are manufactured; and if the plates are found in accordance with the rules of the supervising inspectors, the assistant inspector shall stamp the same with the initials of his name, followed by the letters 'U. S. A. I.' and material so stamped shall be accepted by the local inspectors in the districts where such material is to be manufactured into marine boilers as being in full compliance with the requirements of this section regarding the inspection of boiler plates.

"Sec. 23. *Stamping boiler plates.*—Every plate of boiler iron or steel made for use in the construction of marine boilers shall be distinctly and permanently stamped by the manufacturer thereof, and if practicable, in such places that the marks shall be left visible when such plates are worked into boilers, with the name of the manufacturer, the place where manufactured, and the number of pounds tensile strength it will bear to the sectional square inch; and the inspectors shall keep a record in their office of the stamps upon all boiler plates and boilers which they inspect.

"Sec. 24. *Counterfeiting marks or stamps.*—Any person who counterfeits, or causes to be counterfeited, any of the marks or stamps prescribed for boiler iron or steel plates, or who designedly stamps or causes to be stamped falsely any such plates, and any person who stamps or marks, or causes to be stamped or marked, any such iron or steel plates with the name or trade-mark of another, with the intent to mislead or deceive, shall be deemed guilty of a felony and shall be fined not less than one thousand dollars nor more than five thousand dollars, and imprisoned for not less than two years nor more than five years.

"Sec. 25. *Pressure of steam allowable.*—The working pressure allowable on boilers constructed in accordance with the provisions of this act shall be determined by the rules and regulations of the board of supervising inspectors.

"Sec. 26. *Externally fired boilers.*—No externally fired boiler having its shell constructed of iron or steel plates exceeding an average thickness of thirty-eight one hundredths of an inch shall be employed on any vessel navigating the Red River of the North or rivers flowing into the Gulf of Mexico or their tributaries; and no externally fired boiler employed on any such vessel shall have less than three inches space between its shell and any of its internal flues, and not less than three inches space between such flues when any such flues are more than five inches in diameter; and every such externally fired boiler employed on any such vessel shall be provided with a manhole in the lower part of the front head thereof, of such dimensions as may be prescribed by the board of supervising inspectors, in all cases where the distance between its internal flues is less than three inches.

"Externally fired boilers having shells constructed of iron or steel plates not exceeding an average thickness of fifty one-hundredths of an inch may, in the discretion of the inspector-general, be authorized and employed on steam vessels navigating the Atlantic and Pacific oceans, or salt-water bays or sounds, or the Great Lakes, or any of them; and waters flowing to and from the same, or any of them: *Provided*, That on inspection no plate that is by this act limited to a thickness of thirty-eight one-hundredths of an inch and no plate that is by this act limited to a thickness of fifty one-hundredths of an inch shall be rejected for use if found to exceed those dimensions, respectively, if the approved average thickness thereof does not exceed the limits therein specified."

The measure is especially thorough in relation to the carrying of life saving appliances, such as life boats, rafts, water lights, line-carrying projectiles, and other devices. All these safe-guards are admirable, but are a trifle far fetched when they are made to apply to small motor boats as well as ocean liners. These provisions are as follows:

"Sec. 36. *Equipment for ocean, lake, bay and sound vessels.*—Every vessel subject to inspection navigating the ocean or any lake, bay, or sound of the United States shall be provided with lifeboats, rafts, self-igniting water lights, line-carrying projectiles, with the means of propelling them, drags and pumps, in such number and of such character as shall be prescribed by the rules and regulations established by the board of supervising inspectors and as may be suited to the navi-

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gation in which the vessel may be employed. Every vessel shall have all lifeboats required by law with suitable boat-launching apparatus so arranged as to allow the boats to be clear of the ship's side ready for detaching in less than two minutes from the time the clearing away of the boats is begun. Every seagoing vessel subject to inspection carrying passengers for hire, and any such vessel navigating any of the northern or northwestern lakes, shall have each lifeboat fitted with an approved detaching apparatus which can be operated by one man and which will detach both ends of the boat simultaneously. All steam and motor vessels carrying passengers for hire and engaged in a service which may at any time take them more than forty miles off shore, shall be equipped with an efficient wireless telegraph apparatus, and shall carry a competent operator for the same.

"Sec. 37. *Equipment for river vessels.*—Every vessel subject to inspection, except ferryboats and canal boats of less than 50 tons, navigating rivers only, shall have at least one substantial lifeboat of suitable dimensions, with lines attached, and properly supplied with oars, and kept in good condition at all times, and ready for immediate use; and in addition thereto every such vessel carrying passengers for hire shall have one or more metallic lifeboats of such dimensions and arrangements as the board of supervising inspectors by their regulations may prescribe, which boats shall be carried in the most convenient manner to be brought into immediate use in case of necessity. But where the character of the navigation is such that, in the opinion of the supervising inspector, the metallic lifeboats can be dispensed with, he may exempt any such vessel from carrying the same, or may require a substitute therefor, in his discretion.

"Sec. 38. *Failure to provide equipment.*—If any vessel be navigated without being provided with the appliances or equipment required by sections thirty-five, thirty-six and thirty-seven of this act, or by the board of supervising inspectors pursuant thereto, the owner shall be liable as provided in section seventy-seven of this act, except that the penalty imposed shall be one thousand dollars.

"Sec. 39. *Life preservers.*—A steam vessel, motor vessel, sail vessel, barge, canal boat, and a vessel of any description carrying passengers, whether or not subject to inspection, shall not be navigated or operated unless she shall carry for each person on board one life preserver, of a kind approved by the board of supervising inspectors, to be kept in convenient and accessible places in readiness for immediate use, provided that inspected passenger vessels shall carry at least one such life preserver so kept for each passenger and member of the crew allowed by her certificate of inspection. The owner shall be liable to a penalty of ten dollars for each life preserver lacking or improperly stowed.

"Sec. 40. *False or defective equipment.*—Any person who wilfully and knowingly manufactures or sells, or offers for sale, or has in his possession with intent to sell, life preservers containing metal or other non-buoyant material, for the purpose of increasing the weight thereof, or who shall so manufacture, sell, offer for sale, or possess with intent to sell any other articles commonly used for the preservation of life or the prevention of fire on board vessels, subject to the provisions of this act, so defective as to be inefficient to accomplish the purposes for which they are respectively intended and designed, shall, upon conviction, be fined not less than one thousand nor more than five thousand dollars, and may, in addition thereto, in the discretion of the court, be imprisoned not exceeding five years."

Seagoing passenger vessels and every passenger vessel of 100 ft. and over on the great lakes and rivers shall have not less than three water-tight athwartship bulkheads. All other vessels carrying passengers for hire shall have a collision water-tight bulkhead not less than 5 ft. abaft the stem. The provisions regarding fire protection are quite complete as follows:

"Sec. 43. *Fire protection.*—Every steam vessel subject to inspection carrying passengers or freight for hire shall be provided with suitable pipes, necessary valves, and connections to the boiler or boilers, arranged to convey steam into the cargo holds and such other compartments as may be designated by the board of supervising inspectors for the purpose of extinguishing fire: *Provided*, That other suitable apparatus for extinguishing fire by the introduction of a fire-extinguishing gas or vapor through pipes into such holds and compartments may be substituted. All other vessels carrying passengers or freight for hire shall be provided with such suitable fire-smothering apparatus as may be prescribed by the board of supervising inspectors with the approval of the secretary of commerce and labor. The board of supervising inspectors may require any vessel subject to inspection to be provided with such number and kind of approved portable fire extinguishers as, in the judgment of the board, may be necessary.

"Sec. 44. *Fire pumps and hose.*—Every vessel permitted by her certificate of inspection to carry as many as fifty passengers, or upward, and every steam vessel carrying passengers, which also carries cotton, hay, or hemp, shall be provided with a good double-acting steam fire pump, or other equivalent apparatus for throwing water. Such pump or other apparatus for throwing water shall be kept at all times in good order and ready for immediate use, having at least two pipes of suitable dimensions, one on each side of the vessel, to convey the water to the upper decks, to which pipes there shall be attached by means of stopcocks, or valves, both between decks and on the upper deck, good and suitable hose of sufficient strength to stand a working pressure of not less than one hundred pounds to the square inch, long enough to reach to all parts of the vessel, and properly provided with nozzles, and kept in good order and ready for immediate service. Every vessel exceeding two hundred gross tons burden and carrying passengers for hire shall be provided with two good double-acting fire pumps, to be worked by hand; each chamber of such pumps shall be of sufficient capacity to discharge not less than eighty-five cubic inches of water per stroke; and such pumps shall be placed in the most suitable parts of the vessel for efficient service, having suitable, well-fitted hose to each pump, of at least one-half the vessel in length, kept at all times in perfect order, and shipped up and ready for immediate use. On every vessel not exceeding two hundrd tons one of such pumps may be dispensed with. Each fire pump thus prescribed shall be supplied with water by means of a suitable pipe connected therewith, and passing through the side of the vessel so low as to be at all times under water when she is afloat. Every steam vessel shall also be provided with a pump which shall be of sufficient strength and suitably arranged to test the boilers thereof.

"Sec. 45. *Stoves and stovepipes.*—Every stove used on board of any vessel shall be well and securely fastened, so as to prevent it from being moved or overthrown, and all woodwork or other ignitible substances about the boilers, smokestacks, galleys, stoves, and stovepipes exposed to ignitions shall be thoroughly shielded by some incombustible material in such a manner as to leave the air to circulate freely between such material and woodwork or other ignitible substance; and before granting a certificate of inspection the inspector shall require all necessary provisions to be made throughout a vessel to guard against loss or danger from fire.

"Sec. 46. *Watchmen on passenger vessels.*—Every vessel carrying passengers for hire during the night time shall keep a suitable number of watchmen in the cabins and on each deck to guard against fire or other dangers, and to give alarm in case of accident or disaster. For any neglect to keep the watchmen required by this section, the license of the officer in charge of the vessel for the time being shall be suspended or revoked; and every owner of such vessel who neglects or refuses to furnish the number of men necessary to keep watch as required shall be fined one thousand dollars.

"Sec. 47. *Red night lamps.*—Vessels subject to inspection lighted by electricity and carrying passengers shall be supplied with red standing oil lamps, which shall be kept burning at night.

"Sec. 48. *Fire buckets, axes, and water barrels.*—Every vessel subject to inspection shall keep such fire buckets, axes, and water barrels as shall be prescribed by the regulations established by the board of supervising inspectors. The buckets and barrels shall be kept in convenient places and filled with water, to be in readiness in case of fire, and the axes shall be kept in good order and ready for immediate use. Tanks of suitable dimensions and arrangement, or buckets in sufficient number, may be substituted for barrels.

"Sec. 49. *Equipment of barge carrying passengers.*—Every barge carrying passengers other than the crew while in tow shall be subject to the provisions of this act relating to fire buckets, axes, and boats to such extent as shall be prescribed by the board of supervising inspectors.

"Sec. 50. *Approval of life-saving equipment.*—No kind of instrument, machine or equipment for the better security of life provided for by this act shall be used in any vessel which shall not first be approved by the board of supervising inspectors."

The section of liability of masters and owners for damages will certainly be interesting to them as well as to admiralty lawyers. This section is very clear as follows:

"Sec. 51. *Liability of masters and owners for damages to passengers.*—Whenever on any vessel subject to inspection damage is sustained by any passenger or his baggage from explosion, fire, collision, or other cause, the master and the owner of such vessel, or either of them, and the vessel shall be liable to each and every person so injured, to the full amount of damage, if it happens through any neglect or failure to comply with the provisions of this act, or through known defects or imperfections of the hull, machinery, or equipment; and any person sustaining loss or injury through the carelessness, negligence, or willful misconduct of any master, mate, engineer, or pilot, or his neglect or refusal to obey the laws governing the navigation of such vessels, may sue such master, mate, engineer, or pilot, and recover damages for any such injury caused by any such master, mate, engineer, or pilot."

The section regarding complement of officers and crew contains matter of great interest. It requires that steam vessels engaged in runs of more than 48 hours shall carry at least three licensed engineers and sufficient men in the engineer's force to stand three watches. Whether this applies to the lakes or not is debatable. The run from Buffalo to Duluth is certainly more than 48 hours long. This section also requires motor vessels to carry on board at least one licensed pilot and one licensed engineer, though on boats of less than 35 ft. length between perpendiculars one person may act in the dual capacity of pilot and engineer. The phraseology of the section is as follows:

"Sec. 54. *Complement of officers and crew.*—Any vessel subject to inspection under the provisions of this act shall not be navigated unless she shall have in her service and on board such complement of licensed officers and such crew as may, in the judgment of the local inspectors who inspect the vessel, be necessary for her safe navigation. Steam vessels engaged in runs of more than 48 hours shall have in their complement at least three licensed engineers and sufficient men in the engineer's force to stand in three watches. No steam or motor vessel carrying passengers for hire, whether or not subject to inspection, under the provisions of this act, shall be navigated unless she shall have in her service and on board at least one licensed pilot and one licensed engineer: *Provided*, That in open steam and motor boats measuring less than 35 ft. between perpendiculars, one person, if duly qualified, may act in the dual capacity of pilot and engineer. The local inspectors shall make in the certificate of inspection of the vessel an entry of such complement of officers and crew, which may be changed from time to time by indorsement on such certificates by local inspectors by reason of change of conditions or employment. Such entry or indorsement shall be subject to a right of appeal, under regulations to be made by the secretary of commerce and labor, to the supervising inspector and from him to the inspector general, who shall have the power to revise, set aside, or affirm the said determination of the local inspectors. For every violation of this section with respect to the number of licensed officers prescribed the master shall be liable to a penalty of $500, and for every violation of this section with respect to the number of crew prescribed the master shall be liable to a penalty of $100: *Provided*, That if any such vessel, on her voyage, is deprived of the services of any licensed officer or any member of the crew without the consent, fault, or collusion of the master, owner, or any person interested in the vessel, the deficiency may be temporarily supplied until her

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said complement can be restored. If within 12 hours of the time of the arrival of the vessel at her destination at a port of the United States the master shall fail to explain in writing to the local inspectors such deficiency in the complement of licensed officers and crew he shall be liable to a penalty of $50.

"Any enrolled or licensed vessel subject to inspection under the provisions of this act, carrying passengers for hire, shall not be navigated unless at least one-half of the men composing the deck force of the crew shall be able to speak and understand the English language."

The act also requires steamship companies to keep a correct account of all passengers received and delivered from day to day and in addition a correct list of the names of passengers on each succeeding 300 miles both on the coast and great lakes.

The dissenting report of Eugene Tyler Chamberlain, commissioner of navigation, is quite interesting and is as follows:

"Most of the bill I cordially approve, especially the form of restating present law; the desirability of some new features seems based on insufficient information. I should, however, have joined with my colleagues in favoring the bill unqualifiedly did I not believe that for reasons attached hereto some of its provisions are impracticable.

"*Motor boats.*—Under the bill (Sec. 17) about 20,000 motor boats, carrying passengers for hire, would now be subject to annual inspection. A year hence the number will be about 25,000, most of which will be quite small. Annual inspection calls for the services of a government inspector of hulls and another government inspector of machinery. It carries with it the annual issue of certificates in triplicate by the collector of customs (Sec. 28), annual federal determination of the officers and crew (Sec. 54), daily statement of number of pasengers carried (Sec. 71), and such a little river motor boat (Sec. 37 and 38), under penalty of $1,000, must have 'at least one substantial lifeboat,' while a motor boat with passengers 'more than 40 miles offshore,' must be 'equipped with an efficient wireless apparatus' (Sec. 36), to recite only some of the requirements. Roughly speaking, the same federal machinery is to be employed, so far as it will go, in the case of motor boats, hundreds of which are only 15 to 20 ft. long, as is employed in the inspection of ocean or lake steamers. Such laws could not be made effective without a large national water police force in addition to a greatly enlarged inspection force. (Inspected vessels last year, 8,190.) In such recommendations I cannot concur. In an address a few days ago at Albany the Hon. Elihu Root adequately set forth the congestion of national business. Such recommendations, and others in the bill, divert the executive and legislative branches of government from serious to trivial matters and threaten more harm than they promise good. Owners of small river passenger steamboats justly complain that they must comply with laws which competing vessels, differing only in motive power, at times more dangerous, are exempt. Motor boats regularly employed in carrying commercially more than a fixed number of passengers could properly be inspected. Congress may hesitate to pass a law (Sec. 39) that rowboats must have life preservers. Oars are useful substitutes, and something must be left to the good sense and prudence of the American citizen.

"*Examining boards.*—About 3,500 applicants for licenses as officers of steam vessels are now examined by 46 local boards of inspectors, conveniently distributed throughout the United States, including boards of Alaska, Hawaii, and Porto Rico, recently created by congress to meet obvious needs. No complaint has been made of this method. As a class the deck officers and engineers of American ocean steamers are as competent as those of the ships of other nations. The bill requires hereafter persons in charge of 300-ton schooners and of small commercial motor boats to be examined and licensed as masters, mates, engineers, and pilots, at the rate of about 7,000 applicants annually. I do not think that retired officers, who have held independent command in the United States navy, and captains and chief engineers of our ocean steamships are needed to examine masters of motor boats 15 or 20 ft. long 'carrying passengers for hire,' too small to be documented in custom houses under act of congress. While the average number of applicants for annual examinations for licenses will increase from 3,500 now to over 10,000, the bill provides for only eight examining boards where there are now 46. The bill requires a great extension in inspection work and a corresponding increase in the number of local inspectors, assistants, and clerks. These men should suffice, with existing local boards, to conduct the examinations of motor boat officers.

"*Trials of licensed officers.*—A licensed officer under charges cannot follow his calling. In proportion to the responsibility for life and property necessarily imposed in them, licensed officers are moderately paid. They are especially entitled to a speedy trial, for while under charges they are almost as helpless to provide for themselves and their families as if they were imprisoned. Again, the interests of commerce suggest speedy trials, for the number of available men is often quite limited, especially in Alaska, Hawaii, Porto Rico, in the southern states, and at times elsewhere. The bill proposes only eight boards, where 46 local boards now conduct trials. To secure prompt and thorough trials of licensed officers the eight boards would have to travel far, fast and frequently. The present trial system is not satisfactory, but under any system local inspectors must have the power to suspend an officer temporarily. Such suspension might be limited to 60 days, and for more serious offenses two systems of trial may be suggested:

"(a) Trial by a board composed of the personnel provided in Sec. 15, but to be named by the secretary of commerce and labor, to serve for specified trials at specified places and paid accordingly.

"(b) Trial by United States district judges, of whom there are now 88 conveniently placed throughout the United States and in Alaska, Porto Rico, and Hawaii. These judges already have admiralty jurisdiction. The cost of an examining board in the bill (Sec. 15), including traveling expenses, would approach that of a district judge, district attorney, and United States marshal.

"*Delegation of legislative power.*—To authorize the master of a vessel to 'prescribe regulations' (Sec. 72) for the violations of which a penalty of $500 will be incurred is a novelty in the delegation of legislative power. The bill, particularly in sections 36, 43, 72 and 73 calls for a larger delegation of legislative powers than is usual under English-speaking parliamentary government elsewhere. Some of the regulations authorized to be made should be laid before congress for a month or so, as is done in other countries before they have the effect of legislative enactment.

Respectfully,
E. T. CHAMBERLAIN,
Commissioner of Navigation.

As stated, it is not likely that this bill will be passed in its present form, and certainly not without allowing the interests affected to have the fullest hearing. Steamship interests in general are advised to write for a copy of the bill, which may be obtained from Chief Clerk, Senate Document room, Washington, D. C., by asking for Senate Document No. 701, Second Session, 60th Congress.

The 116th regular meeting of the Detroit Engineering Society will be held at the Association hall, Stevens bldg., Friday, Feb. 19, 1909, at 8:00 p. m. Mr. A. Geo. Mattsson, in association with Messrs. Charles Creem, George Turnbull and Bernard J. McCabe, will present a paper, "The Balancing of Marine Engines." The usual dinner will be served for members and friends at the Ste. Claire Hotel at 6:00 p. m.

The vessels of the Rutland Transit Co., better known as the Ogdenburg Line, will not stop at Cleveland next season. The Cleveland office will be closed.

GREAT LAKES PROTECTIVE ASSOCIATION.

Representatives of lake vessel interests and underwriters met this week in the office of Willcox, Peck & Hughes, 3 South William street, New York, and formed an organization to safeguard lake navigation and to put in operation a plan of inter-insurance. The new organization was named the Great Lakes Protective Association and is now ready for business. Among those present representing lake vessel owners were J. S. Ashley, J. H. Sheadle, H. Coulby, W. C. Richardson, Harvey D. Goulder, D. Sullivan and E. T. Douglass. The underwriters were represented by Percy Chubb, Frank Herrmann, Herbert Appleton, Douglas Cox, W. F. Whittlesly, W. W. Parsons and E. P. Lenihan.

Mr. J. S. Ashley took a most active part in the discussion and told of the measures that lake owners intended to take to prevent accidents. A set of rules for the prevention of accidents was formulated and adopted. After the adjournment of the meeting with the underwriters, the advisory committee of lake owners met and approved the power of attorney which had been prepared by Mr. Harvey D. Goulder. The terms of the power of attorney were gone over carefully by eminent legal talent in New York and pronounced by them as an ably drawn and a perfect legal document. The power of attorney is as follows:

"Whereas, the vessel owners' agreement for ascertaining and preventing causes of loss or damage to lake ships includes as one means to this end, reserving from conventional insurance 5 per cent of insurance valuation and placing the same in the loss sharing plan under the general direction of the advisory committee; and

"Whereas, the advisory committee, at its meeting on Feb. 1, unanimously selected Willcox, Peck & Hughes, incorporated, of New York, as the attorney-in-fact to transact there, or at any place approved by the advisory committee, the business contemplated in said loss sharing plan, under the name 'Great Lakes Protective Association,' and has decided

"1. That risks be confined to great lakes vessels insurable with old line underwriters, as determined by the advisory committee, and owned or managed by those included in said agreement who execute similar instruments to this said attorney-in-fact (such participating members being hereafter called subscribers);

"2. That the fiscal year shall be from April 1 to March 31, inclusive;

"3. That all the terms, conditions

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and rate of current lake hull marine policies and riders, except protection and indemnity, taken out by such subscribers upon or toward the other 95 per cent of insurance valuation of their respective vessels shall govern as to such 5 per cent, and where there is no insurance upon or toward the other 95 per cent the terms, conditions and rate of any current general form of such policy and riders, without protection and indemnity, selected by the owner shall govern, and in all cases 10 per cent less than said gross premium rates respectively shall be the initial contributions:

"4. That all initial contributions shall be payable within 30 days after issuance of the certificates of participation.

"5. That no risks shall be assumed attaching after Dec. 31 in any fiscal year except such risks as shall expire on or before the end of such fical year.

"Now, therefore, we, as subscribers, hereby agreeing to participate in such loss sharing plan, do hereby appoint the said Willcox, Peck & Hughes, incorporated, our attorney-in-fact in our name, place and stead, subject to the regulation and control of said advisory committee:

"To subscribe with our name or in our behalf, and issue, change, modify and reinsure, certificates of participation as to said 5 per cent of insurance valuation, containing such terms, clauses, conditions, warranties and agreements as they deem best; to demand, receive, collect and receipt for all contributions; to perform or waive all agreements or stipulations of any such certificates; to settle all losses; to receive, give or waive any notices or proofs of loss; to appear for us in any suits, actions, or proceedings and bring, defend, prosecute, compromise and settle the same; and, in general, whether specifically authorized herein or not, to do or perform every act that we, ourselves, could do in relation to the making, performance, compromise and settlement of all matters pertaining to said loss sharing plan.

"As the purpose of this power of attorney is only to enable us through our said attorney to participate in said loss sharing plan with other subscribers, the exercise of the powers hereby granted shall be strictly confined to such purpose and be subject to the following limitations, viz:

"1. The subscribers shall participate in the risks, expenses and profits of the association in proportion to the net contributions which they respectively make to the association.

"The liability and participation of the subscribers shall be calculated separately for each fiscal year, April 1 to March 31, inclusive.

"All subscribers shall participate in the liability on all risks commencing during the fiscal year, and such liability shall continue until the final expiration of all such risks.

"The apportionment made by the attorney and approved by the advisory committee shall be final and conclusive as fixing the respective liability and participation of the subscribers.

"2. Each subscriber shall be liable only for his, their or its proportion of the risks assumed by the association, no subscriber being directly or indirectly liable for the obligation of any other subscriber.

"3. The attorney shall keep separate accounts and records of the operations of each fiscal year, April 1 to March 31, inclusive, which shall show the receipts and disbursements, together with a full record of all losses and claims and such other information as the advisory committee may desire. Such accounts and records shall be the property of the association and shall be turned over to the advisory committee on demand.

"Funds belonging to the subscribers shall be turned over to the treasurer as received, and deposited or invested as the advisory committee may direct, and all disbursements shall be made by voucher checks signed by the attorney and treasurer and countersigned by one other authorized officer of the advisory committee.

"4. In case at any time the cash in the hands of the treasurer to the credit of the subscribers for any fiscal year shall be insufficient to meet the losses, expenses and other liabilities incurred for that year, the attorney, with the approval of the advisory committee, may levy an assessment on the subscribers for the necessary amount, pro rata to their contributions, and may draw upon us at sight for our proportion of such assessment after having given us written notice thereof.

"5. As a further security to the certificate holders and others interested in respect to the obligations of the association, the attorney shall indorse all certificates with its corporate guarantee of the solvency of all subscribers and the prompt payment of all legal claims under such certificates.

"6. As compensation to said attorney and in consideration of its said guarantee to the certificate holders and others interested, said attorney shall receive a commission of 15 per cent on all net contributions collected for account of the association, in consideration whereof said attorney shall defray all expenses incidental to the business transacted hereunder, excepting legal expenses.

"7. The attorney shall make an annual report to the subscribers as soon as practicable after March 31 of each year of all receipts, disbursements, losses, claims and statistics required by the advisory committee. Profits shall be paid to the subscribers as and when the advisory committee may direct.

"8. This instrument may be canceled by either party on the 31st day of March of any year as to all liabilities to attach in respect of any property thereafter, by written notice 60 days in advance; this power of attorney continuing in full force as to all liabilities attaching prior to such cancellation until all liabilities and obligations of both parties have been liquidated and fulfilled. All dividends or profits of any subscribers so withdrawing may be held by the treasurer until all liabilities of such subscriber have been liquidated."

TO CHANGE IMMIGRATION ACTS.

A bill has passed the senate and been favorably reported upon by the house committee on immigration, which provides relief for steamship lines from the discrimination which they complain is the result of Section 12 of the Immigration Acts of 1907. The bill is believed to have a fair chance of passing the house.

The objectionable section places restrictions upon alien passengers going out of the United States on shipboard, and the bill is designed to suspend such provisions until they are also made applicable to such passengers going out by land routes.

The measure has the endorsement of the secretary of commerce and labor, who says of it that from the point of view of the procurement of reliable statistics with regard to the emigration of aliens from the United States, it would be highly desirable to require all railway lines doing an international business to comply with the provisions of section 12, which are now applicable only to steamship lines. He concludes, however, that if it is not made applicable to one class of transportation it should not apply to another.

The bill relates only to business between the United States and Canada and the United States and Mexico.

Tietjen & Lang, Hoboken, N. J., have the schooner Marcus L. Urann in dry dock to repair damages which she recently sustained from fire while at Newport News. She is owned by Robert Blair, Boston, Mass.

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CAUSES OF STRANDINGS ON COAST AND LAKES DURING 1908.

The hydrographic office has just issued a study of the causes of strandings occurring in 1908 on salt water and on the great lakes. The causes are analyzed as follows:

Strandings may be considered as occurring through three principal causes:

I. Through causes which are practically unavoidable, such as being driven ashore in a gale, damage to steering gear or engine at critical moments, grounding in endeavoring to avoid collision with another vessel, or owing to having sprung a leak, etc. In fact, stranding *through any cause not attributable to any person, either on shore or on board the vessel.*

II. Through causes directly or even remotely traceable to the error, negligence, or ignorance of some person or persons *not on board the stranded vessel,* such as incorrect aids to navigation, uncharted rocks or shoals, obstructions left by other vessels, such as abandoned anchors in shallow water, sunken wreckage, etc.

III. Through the errors, negligence, or ignorance of *persons on board the stranded vessel,* such as faulty navigation, ignorance of pilot, bad steering, reporting incorrectly a sounding, officer leaving deck at a critical moment, etc.

STRANDINGS IN DEEP-SEA NAVIGATION.

There were recorded 1,083 cases of strandings of vessels engaged in deep-sea navigation, and of these the definite causes were ascertained in 361 cases, and of these, according to the above classification, their causes were as follows:

Series I, 169 cases, approximate per cent, 47.0.

Series II, 62 cases, approximate per cent, 17.0.

Series III, 130 cases, approximate per cent, 36.0.

The cases occurring under the first series of causes may be broadly stated as due to "natural" conditions over which we may not have control, and the numbers of which we can not expect to reduce. The world's increase in tonnage keeps pace with the safeguards which we attempt to throw about commerce. The additional security obtained by more complete surveys, finer lights, and more numerous beacons, buoys, and other aids to navigation, is to a great extent offset by the increase in the number of vessels employed, and in the carrying of commerce to more and more remote localities. We can not expect much reduction in this class of disasters. The mere holding of the annual number to the present figures would, with the increase of navigation, be a triumph.

Those strandings, due to the second series of causes—that is, probably, or even possibly, due to the inattention or inadvertence of some person or persons exterior to the stranded vessel, can most certainly be greatly reduced. It is mainly in this class of strandings that the greatest number of cases will, if traced to their ultimate source, be found to have been entirely unnecessary. No captain, no body of mariners, will willfully hazard their lives, or even their livelihood, by running their ship ashore. Masters do not wish to run at full speed in a fog or in thick weather, but "the time has got to be made."

Among the many ways in which the safety of a vessel may be thus jeopardized by other than her crew, directly or remotely, may be mentioned: The issuance of known obsolete or incorrect charts, unchartered rocks or shoals on charts supposed to be correct, misplaced buoys or other aids to navigation, inefficient or non-working lights or fog signals, wrongly compensated compasses by shore authorities, grounding upon unanticipated obstructions placed or left in shallow waters by other persons, such as abandoned anchors, jettisoned cargo, sunken wreckage, of which no notice has yet been received. Stranding owing to thick smoke from forest fires, a responsibility largely caused by other than the master and crew of the vessel, is a cause given in many cases for stranding, though perhaps a more thorough knowledge of the compass error, might have, in some of these cases, saved the vessel from grounding. This cause may, in the future, be obviated by the plans now being put in force for the preservation of our forests. It is needless to indicate how strandings due to the above-mentioned causes could be prevented, yet the question of incorrect charts deserves special mention. In some cases charts are furnished by the vessel's owners, while in other cases masters are required to supply their own charts. It is the opinion of the Hydrographic Office that charts should always be supplied by the vessel's owners. Charts are as much a necessary part of the vessel's outfit as are compasses or steering gear.

SUPPLY OF CHARTS.

In a certain case tried during the year, the court made the sentence of the master much lighter because the owners had neglected to supply the vessel with proper charts.

When a master or agent of a vessel receives a chart or other aid to navigation from any responsible source, such as a chart-publishing house or any authorized agency for the sale of charts, he can not fairly be held responsible for a stranding traceable to an error that existed upon this chart prior to its purchase. Such responsibility should certainly rest with the person who issues the incorrect publication without, at least, making known the date to which he is satisfied that it is correct. In certain cases it is undoubtedly the fact that no chart would have been better than the incorrect chart used.

Persons purchasing a chart should insist upon having the date to which the chart has been corrected stamped upon the margin before they would consent to purchase it. Dealers carrying large stocks of charts may not find it profitable to correct copies on hand, yet the knowledge of this fact alone, that the chart had *not* been corrected up to date, would be of certain advantage to the master, who would then more certainly consult his Notices to Mariners and other sources with regard to its trustworthiness since leaving the office of its publication. The U. S. Hydrographic Office and the U. S. Coast Survey Office stamp upon the margin of the charts sold to dealers the date to which the aids to navigation have been corrected. Errors that have been found in charts are corrected as soon as possible, and in some cases, owing to more complete surveys, a portion of a chart that has been extensively corrected will bear little resemblance to that portion of the former chart. Thus we may see what an important factor in reducing strandings would be the suppression of incorrect and obsolete charts. During the present year a British steamer fell in with a vessel in distress 300 miles from land and, stopping, furnished the vessel with needed supplies, among which was a new navigational chart, the only chart of that locality on board being a chart published in 1857 with corrections up to 1861.

STRANDINGS DUE TO NEGLIGENCE.

The causes of the third series of strandings—due to the acts, the negligence, or ignorance of persons on board the stranded vessel—comprise any and all derelictions, such as errors in navigation, deviation of compass not known; in fair weather, not determining position of vessel, not heaving the lead, bad lookout, bad steering, improper allowance for known current, officer leaving the deck when in a critical position, not

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carrying out orders received when taking over the watch, passing wrong course or orders, not passing proper information when being relieved of the watch, setting too fine a course when uncertain of current or vessel's position, wrong course given, course misunderstood, not allowing for different action on compass when different cargoes are carried, mistaking one light or aid for another, announcing incorrect sounding, etc. Every one of the above-mentioned errors has been the cause of at least one stranding within the past year, none of which would have occurred except for that particular error.

One captain writes: "The deflection of the compass with different cargoes of iron ore can only be determined by observation. I don't think any rule could be laid down. I have noticed as high as ½ point and as low as ⅛ point difference on the quadrants. More especially there is where it is easy to make a mistake, thinking that because one has made a good course with one cargo, he should do it with another. * * * Frankly, I am inclined to think that a better knowledge on the part of all masters as to the theory of deviation—a study of the compass—would to a great extent eliminate strandings. * * * Groundings in narrow channels can hardly be traced to such a source, but I think that groundings occurring along coast lines could be largely cut out by a better understanding of the laws governing the compass."

Fog or thick weather is frequently mentioned as a cause for stranding, but to be an excusable one, local conditions should show that for some imperative reason it had been impracticable to anchor; reasons such as deep steep-to waters with bad holding ground, gales, and narrow channels. Anxiety to make quick trips, even for commercial advantages, does not constitute a good excuse, and strandings under such conditions, in fog, when by losing a little time the vessel could have proceeded more safely in clear weather, should be considered faulty navigation if the master has discretion. If the master is directed by the agents or owners to disregard such precaution, the fault is theirs, and becomes a cause assignable to persons other than those aboard the vessel. Indeed much of the stranding in fog and thick weather will be found to be attributable to other than faulty navigation on the part of the master.

GROUNDING DURING THICK WEATHER.

A vessel grounded during thick weather, on a steep-to coast where irregular currents were known to exist, but the set of which was not accurately known. The captain was attempting to make an anchorage, even in 30 fathoms. The court found that the captain was in nowise blamable, mainly basing their decision on the fact that he was doing all he could to bring his vessel to anchor.

In another case, where there was no reason why, during thick weather, the vessel should not have anchored, there being along the route already traversed numerous places for anchoring, while the emergency did not require special speed, the court found the captain blamable.

Of course it is not expected that vessels shall, in the open sea, come to an anchor in thick weather. This article deals with strandings, and strandings do not occur in deep water. It is when approaching narrow channels with shoal water in proximity, and when not absolutely sure of his vessel's position and his compass error, that the master would be called upon to make his decision as to whether or not to proceed. Standing upon some isolated rock or shoal with plenty of sea room on each side, even though occurring in thick weather, should not be attributable to the state of the atmosphere, but to the faults of navigation in either setting too fine a course, in having compass error, or in bad steering.

When a vessel is engaged upon a duty where urgency of arrival in port is demanded, there may be some excuse for continuing in thick weather, even where anchorage is available, but such occasions must be rare. In many instances "the more haste the less speed" proves to be the result. Vessels carrying the mail and passengers are frequently left stranded for hours, longer than the hours that would have been lost in anchoring to await clear weather.

FOG, SMOKE AND SNOW.

One writer says, "Fog, smoke and snow no doubt play a very important part in stranding. If we always had clear weather there would be no occasion for going ashore, unless the vessel's condition warranted it, or through some willful or careless act of the one in charge. * * * It is really deplorable the number of men in charge of fine steamers who are lacking in that important theory—the finding of the compass error."

It is well to note here that "the one in charge" may sometimes prove to have been in reality the helmsman who steadied the ship on a misunderstood course, the leadsman who reported an incorrect sounding, or the dredger who dumped excavated dirt into the channel.

Fifty-three per cent of the cases of stranding of vessels engaged in deep-sea navigation seem to have occurred from causes that might have been avoided, and in that fact there is food for much thought among our maritime community.

STRANDINGS ON THE GREAT LAKES.

It has already been stated that there were reported 201 cases of stranding during the season of 1907. This represented the entire number for that season. There have been received for record 217 cases of stranding occurring during the season of 1908. While this is a much greater proportion of the entire number than that of vessels engaged in deep-sea navigation, owing to better facilities for collection, yet it does not represent the entire number, and therefore a partial list of those disasters occurring in 1908 exceeds the entire list for 1907 by some 8 per cent.

It is but reasonable to suppose that this increase of disasters is due to an increased commerce. The transportation on the Great Lakes now forms an enormous part of that of the entire world and is constantly increasing in volume. The navigation of the Great Lakes, in their entirety, is limited to a "season" and does not exist during the entire twelve months of the year, as does that of the Mediterranean, an analogous body of water. The average length of the season of navigation is seven months and twenty-two days.

The greater part of this transportation consists of raw materials, grain, ore, coal, etc., and there are various narrow channels connecting the line of lakes. When navigation is open, these products must be transported as rapidly as possible, and there is practically a continuous stream of commerce which must take advantage of the season of the year. There is in this fact perhaps some justification for continuing instead of anchoring in thick weather, although that is doubtful.

AMOUNT OF FREIGHT CARRIED.

The amount of freight carried during the season of 1906 by United States vessels on the Great Lakes and the St. Lawrence River was 75,610,690 net tons, which was 28.5 per cent of the total tonnage carried by all United States vessels (265,546,845 tons) for the entire year. But even this percentage is misleading. For an entire year at this rate the transportation on the Great Lakes would be 113,415,000 tons, an increase of 37,803,310 tons. Adding this increase

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to the total United States tonnage gives about 303,500,000 tons, of which the lake tonnage would represent 38 per cent. In other words, while the season is on, much more than one-third of the daily water transportation of the United States, including deep-sea, lakes, and western rivers, is being carried on the Great Lakes.

The income received from the carriage of freight on the Great Lakes during the season of 1906 was $52,076,533 or 29.7 per cent of the total income received for carrying freight by all United States vessels for the entire year—29.7 per cent in two-thirds of the year. These figures are from U. S. Census Bulletin No. 91. "Transportation by Water, 1906." Government Printing Office, 1908.

The total freight handled by water in the Duluth district alone during the season of 1906 was 37,376,213 tons. This tonnage was greater than that of New York (30,500,000) and even greater than that of London (33,500,000) for the entire year.

GREAT LAKES NAVIGATION.

Navigation of the Great Lakes differs greatly from that of deep-sea vessels. These differences constitute advantages and disadvantages. Good piloting is more a requisite than astronomical sights, etc. The master is rarely out of sight of land, except in case of smoke or fogs; there is no perceptible rise and fall of tide, while vessels are frequently laden to within 6 in. of the draught limit of the channels. Routes are continuously traveled, enabling the masters of vessels to become well acquainted with the physical features of the coasts, etc., and there are also narrow channels to be traversed where meeting, one or both, may be grounded in endeavoring to pass.

While in some cases the vessels will have frequent opportunities to anchor, being in shoal waters, in other cases the thick smoke from the periodic forest fires, or thick fogs, or snow storms, will surprise the vessel in a narrow, perhaps tortuous channel, where to stop would be out of the question. Where a vessel trading between San Francsco and Yokohama has two chances of stranding, a vessel trading between Duluth and Buffalo would have a dozen.

Of the 217 recorded cases of stranding, the cause of the stranding was ascertained in 167 cases, divided according to the before-mentioned series, as follows:

Series I, 70 cases, equal to 42 per cent.

Series II, 59 cases, equal 35.5 per cent.

Series III, 38 cases, equal 22.5 per cent.

From the above it would seem that 42 per cent of the cases were unavoidable, while by superior intelligence and greater care on the part of persons, either on shore or afloat, 58 per cent of these strandings might have been avoided. This may appear to be an excessive amount, but in the consideration of the causes, wherever there has been a reasonable doubt, the benefit of the doubt has been given to the master, the crew, and the owners, and the case has been classed as "unavoidable," and therefore the percentage under that head (Series I) is perhaps really too great.

With the more complete data, which will be collected during the present year, more accurate results should be obtainable. Meanwhile it is hoped that the results herein set forth may tend to at least diminish the constantly increasing number of strandings.

NORTHERN NAVIGATION CO., OF ONTARIO.

The annual meeting of the Northern Navigation Co., of Ontario, was held at Toronto, Jan. 26. The report submitted to the stockholders showed a falling off of about $100,000 in the gross receipts, and of $39,000 in the net receipts, as compared with the previous year. The directors reported favorable progress on the construction of the new steamer Hamonic, which is to go into service between Sarnia, Sault Ste. Marie, Port Arthur, Fort William and Duluth, on June 15. The report states that the directors hope to resume the payment of semi-annual dividends this year.

ASSETS.

Eight steamers	$887,955.88	
Buildings, furniture, etc.	12,867.58	$ 900,823.46
Fuel and supplies	20,295.78	
Insurance unexpired	12,211.60	
Accounts receivable	43,168.18	
Stocks and bonds	1,500.00	
Bills receivable	3,000.00	
Hamonic, new steamer	282,152.59	
Repair and maintenance	11,855.61	374,183.76
		$1,275,007.22

LIABILITIES.

To shareholders:		
Capital stock	$843,600.00	
Renewal fund	68,058.73	
Marine insurance fund	15,285.20	
Dividend at 8 per cent annum on paid-up capital	67,315.31	
Balance profit and loss	49,637.09	$1,043,896.33
To the Public:		
Bills payable	214,059.85	
Traders Bank of Canada	17,051.04	231,110.89
		$1,275,007.22

PROFIT AND LOSS ACCOUNT.

Balance from 1907	$ 55,996.20	
Appropriation for directors' fees, including secretary-treasurer's salary	1,160.00	$ 54,836.20
Dividend on stocks and bonds		85.00
Rent of diving suit		180.00
Gross earnings of steamers	531,289.18	
Less total expenditure	428,915.42	102,373.76
		$157,474.96

Interest one year on renewal funds, $52,475.00 at 3½ per cent	$ 1,836.62	
Steamers' renewal fund	24,000.00	
Interest one year on marine insurance fund, $14,420 at 6 per cent	865.20	
Repair and maintenance	10,000.00	
Claims, 1907, paid 1908	3,820.74	
Dividend 8 per cent, on paid up capital	67,315.31	
Balance	49,637.09	
		$157,474.96

The following were elected directors for the current year: W. J. Sheppard, C. E. Stephens, W. E. Davis, F. A. Lett, C. D. Warren, H. B. Smith, Hon. J. S. Hendrie, H. Y. Telfer, W. D. Matthews. The only change in the board is the substitution of W. E. Davis, passenger traffic manager of the Grand Trunk railroad and Grand Trunk Pacific railroad, for H. C. Hammond.

At a subsequent meeting of the directors W. J. Sheppard, of Waubashene, Ont., the former vice president, was elected president to succeed H. C. Hammond, whose severe illness had been the source of much distress to his associates; H. Y. Telfer, of Collingwood, was elected vice president, and C. E. Stephens, of Collingwood, was re-elected secretary-treasurer.

CANAL WORK PRAISED.

The committee on interstate and foreign commerce of the house of representatives, which visited the Isthmus of Panama during the holiday recess, is reported by Representative Esch, of Wisconsin, a member of the committee, as having found a great transformation to have taken place since the previous visit of the committee four years earlier. In an account of the inspection printed in the *New York Evening Post*, Representative Esch speaks in the highest terms of the work accomplished by the United States government. With regard to the Gatun dam, about which there has been so much controversy, Esch says that full hearings were given by the committee, at which Col. Goethals, chief engineer and chairman of the canal commission, Col. Sibert, Major Gaillard, Col. Hodges, assistant chief engineer, and Admiral Rousseau, all commissioners, testified as to their absolute faith in the present plans for the locks and dam at Gatun, and their ability to construct them so that they would be permanent and safe and meet all requirements.

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ATLANTIC COAST NOTES.

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

The stockholders of the Boston Steamship Co. voted to liquidate at a meeting held in Boston on Feb. 15. The company was formed by Boston capitalists about eight years ago, with Alfred Winsor as president, two steamships being built and operated in the Pacific trade to China and Japan. The impossibility of operating American steamers profitably without government aid against the coolie labor of the Japanese and Chinese crafts was the reason advanced for the decision.

Through leaving Queenstown 32 hours behind her scheduled time, and meeting with adverse weather throughout the entire passage, the Cunard liner Lusitania made her dock on Sunday, instead of Friday, as usual. As already reported the big steamer lost an anchor at Queenstown while waiting the subsidence of the gale encountered while en route from Liverpool. On arrival at New York she was found to have suffered considerable damage to her deck fittings from the violence of the seas.

The steamship Potomac, of the Norton Line, arrived at Boston on Sunday after an unusually exciting trip from South America. Shortly after leaving Montevideo a fire which had been discovered and supposedly extinguished at the wharf broke out again in the cargo, which consisted of jerked beef and burlap coverings. The work of extinguishing the fire was made doubly hard by the suffocating fumes arising from the holds, but the workers were eventually successful. At Havana all but 300 tons of the cargo was unloaded and the Potomac sailed for Boston Off Hatteras she ran into a gale in which she pitched and rolled heavily, making little headway.

The Allan line steamship Pretorian has arrived at Philadelphia from Glasgow with 30,000 bushels of Scotch-grown potatoes. Large shipments of potatoes are also arriving from Ireland, Germany and other European countries.

When the Cunard liner Caronia, which arrived this week at New York from the Mediterranean, was at Fiume Capt. Dow and First Officer Palfrey each received a gold watch from the Austrian Lloyd's Steam Navigation Company of Trieste for their assistance in putting out a fire on the Austrian steamer Vorwaerts. On Dec. 17 the Caronia sighted the Vorwaerts on fire and Capt. Dow sent some fire-fighting apparatus and men aboard the vessel. He also kept the searchlight trained on the Vorwaerts while the crews were at work.

Representative Small, of North Carolina, the author of the bill providing for the purchase of a lighthouse on Diamond Shoals, off Cape Hatteras, on Feb. 13 submitted to the house committee on interstate and foreign commerce a proposition whereby the government, instead of paying rental with the option of buying the lighthouse after five years for $600,000, should pay $2,000,000 for the structure as soon as completed and approved, no money to be paid the builders while the work of construction is in progress.

New York to Bermuda and return, first-class, $20. The inauguration recently of the Bermuda-Atlantic line, between New York and Bermuda, has precipitated a passenger rate war between that company and the old Quebec Steamship Company, the result being the cut to $20.

The first cargo ever entered at Port Arthur, Texas, arrived last week on the old Clyde line steamship Goldsboro, from Frontera. The shipment included both bananas and plantains.

The crew of the wrecked four-masted schooner Sarah W. Lawrence, who were rescued under unusual circumstances off the Delaware breakwater last Wednesday, arrived the following day at Philadelphia.

The four-master schooner Elvira Hall, from Jacksonville for Boston, has been abandoned at sea waterlogged. She left Jacksonville on Feb. 4 and early on the morning of Feb. 8 struck a sunken object and filled rapidly. In less than five hours the water was flush with the decks in spite of all efforts to prevent the vessel filling. All hands were taken off the schooner by the schooner Thelma and landed at Norfolk.

The work of unloading the cargo from the damaged compartment of the liner Florida, which sank the Republic off Nantucket, commenced on Saturday. Two deep sea divers entered the hold of the vessel, at her wharf at pier 7, Bush Docks, Brooklyn, and it will probably be a week before the job is completed. The divers report that the cases of wine and olive oil were, with the exception of a few which had been smashed, in good condition. A large part of the cargo in the hold consisted of caraway seeds and talcum powder, and it is estimated that over 3,000 bags of seeds have broken open through the swelling of the seeds.

The German steamship Standard, which left Havana on Saturday afternoon for Philadelphia, is bringing the first consignment of the new crop of Cuban molasses to the Delaware. The molasses is carried in bulk and will be speedily pumped ashore in receptacles specially prepared for the purpose. The Standard will continue in the trade until next summer.

The Italia steamship line between Philadelphia and the Mediterranean, which suspended service owing to the vessels being chartered by the government after the earthquake, has resumed service. The steamship Ancona left Naples on Jan. 25 for Philadelphia via New York.

The two-masted schooner P. E. Wharton was driven ashore about two miles north of North Beach lifesaving station on Jan. 28, during the heavy gale that blew along the Delaware and Virginia coast. The crew landed from the schooner, which struck easy, in their own boat and were received at the lifesaving station. Attempts were made to float the schooner next day by the revenue cutter Onondaga, but broken hawsers was the only result. On Sunday the schooner was reported breaking up and being stripped by Chincoteague wreckers.

The steamship Hamilton of the Old Dominion line, from Norfolk to New York, on Jan. 30 collided with a heavily loaded car float in Hampton Roads. The accident happened 40 minutes after the steamer had left her wharf, a large hole being knocked in her bow. A wireless call from the Hamilton brought tugs to her assistance, and she returned to the city. Immediately on arrival the work of unloading the cargo was commenced, the forward compartment of the vessel being flooded. The float was blown directly across the steamer's bows by the violence of the wind, four of her load of cars going overboard.

The derelict destroyer Seneca, stationed at Staten island, last Friday removed another obstruction to navigation by destroying a barge sunk off Barnegat.

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Modern Methods of Lake Navigation for the Beginner.

BY CAPT. GEORGE TRIMBLE.

Scientific navigators do not recognize the term "Scientific Lake Navigation." Scientific navigation, as they understand it, is navigation by means of astronomy and higher mathematics and this is not practical for the great lakes. But many features of lake navigation are now coming into general use that, up to a few years ago, were not thought worth the trouble of even trying. This new work seems generally to be called "scientific lake navigation." It is so rapidly coming to the front and proving itself so valuable that the lake navigator who has not mastered some part of it is considered to be very much of a back number indeed. Many books are offered for sale dealing with this subject, nautical schools have been established at many of our lake ports and are all doing excellent work. But it has appeared to me all along that nautical books and nautical schools seem to be addressed to the navigator only. The prospective navigator finds much that is puzzling in these books and generally gives up the study with the idea that it is entirely beyond him. While the whole subject is extremely simple it does not appear so to him when he tries to understand the technical language and long-drawn-out explanations that are given on this subject.

The object of this work is to present the subject in a way that can be easily understood by anyone with the education of the ordinary lake wheelsman or watchman. The subject can be mastered at home in a very short time and with only a small outlay for books and instruments. Much puzzling detail is cut out—these can be thoroughly learned later from any of the many excellent works that can be bought on this subject and which will be easier understood after the work, in outline, has been gone over here.

In what way do these new methods of lake navigation differ from the methods that have always been used on the lakes?

We all know that the greatest part of lake navigation is piloting of rivers and narrow channels and not much that is new in that line can be offered. Books and schools will teach you very little about that subject—good practical experience is required to make good river pilots. In this line our lake pilots have the reputation of being the best pilots in the world.

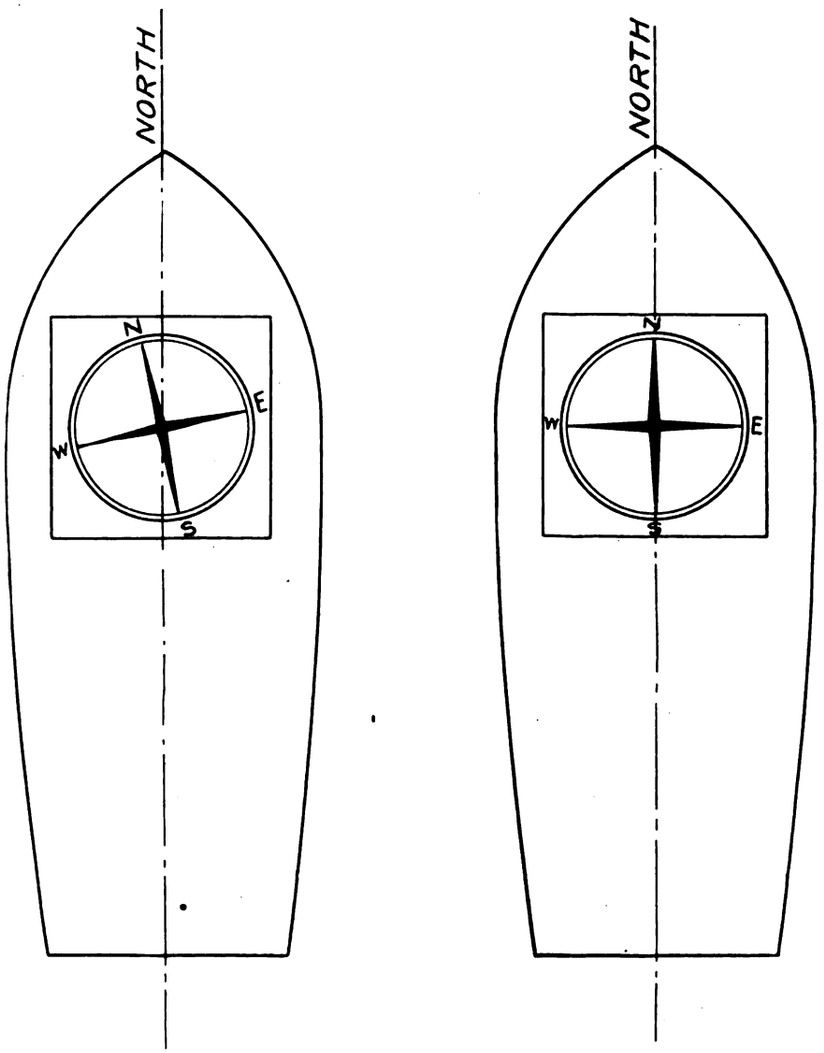
These modern methods of lake navigation apply principally to the navigating of a ship scientifically and thereby carefully on the open lakes.

The most important part in the whole study is the finding of the error of the compass by bearing of the sun, moon, planets and stars, This means the perfect navigating of a ship by being able at all times to shape perfect courses no matter if every compass aboard is out of whack. And compasses get out of whack oftener nowadays than they used to. In a modern lake steamer a compass has a hard time to retain its magnetism—steel everywhere, floor, sides and roof of the enclosing pilot house, steel spars, decks, etc. And then electric unloading hoists sometimes put every compass on a ship out of order.

Finding the error of compass by bearings of the heavenly bodies being the most important as well as the most interesting part of this work we will take up this subject first.

Error of the compass is called deviation of the compass. We must be sure we know just what deviation of the compass means and why a pilot must know this error in order to shape a course.

Deviation of the compass means



THE WAY OUR COMPASS HEADS. FIG. 1. THE WAY OUR COMPASS SHOULD HEAD.

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simply that your compass does not head as it should. It deviates either to the one side or the other. You could not make a perfect course from one place to another with an imperfect compass unless you knew the amount of its error and allowed it.

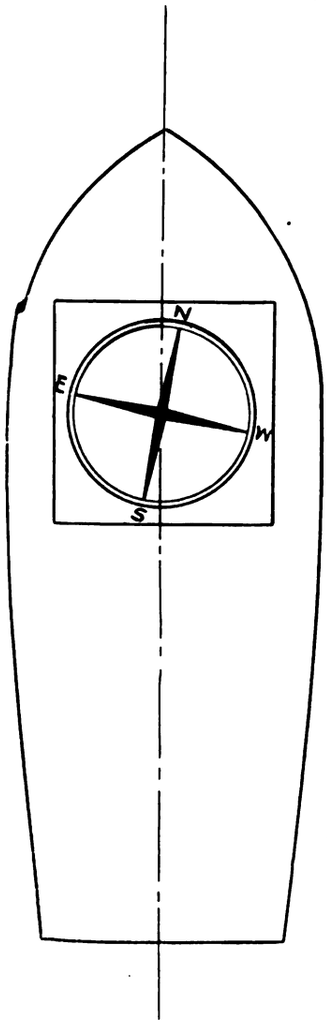
We will suppose that our ship is lying at a dock or a pier where we know that she heads exactly north. Out on the dock away from any disturbing influence, such as iron or steel, we have a perfect compass. This compass points in the same direction as the pier—exactly north. We now bring this compass aboard our boat and put it in the binnacle box, but instead of showing north, as it should, we now find that it heads north by east, disturbing influences aboard the boat having caused it to deviate from its proper bearing. It shows one point of westerly deviation. Its north point is one point to the westward of where it should be.

When you wished to go north with your ship with this compass you would have to steer north by east as shown in the foregoing cut, Fig. 1.

But we cannot always correct our compasses at a dock or pier because we may have no way of finding just how this dock or pier may head. of course we can correct them on the river ranges. The true bearing of all river ranges is given in the lighthouse books or on charts. These have only to be corrected for variation (see variation of the compass) and you will then get the correct magnetic bearing of any range. In several different lake pilot books the bearings are all corrected for you and you have only to refer to them to get the correct magnetic bearing.

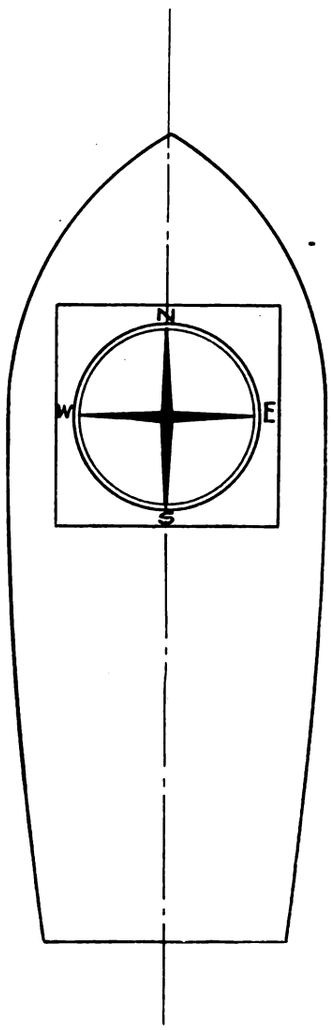
Suppose we headed our ship on a river range and found that our compass showed north half west. We refer to the book and find that she should head due north. Our compass therefore shows a half point of easterly deviation. Its north point is a half point to the east of where it should be.

Thus:



THE WAY OUR COMPASS HEADS.

FIG. 2.



THE WAY OUR COMPASS SHOULD HEAD.

When you wished to go north with your ship with this compass you would have to steer north half west, as shown in Fig. 2.

For compasses that deviate to the east simply allow the same amount to the west and you will make just as good courses as if your compass was correct.

But don't make a mistake when naming this error or deviation on courses in other directions. Suppose our ship was on a range and our compass shows south by west. But we find the correct bearing should be due south. (See Fig. 3.)

The south point of our compass is heading one point to the westward of where it should. It might seem to us that this would be westerly deviation but it is easterly deviation. Deviation is always figured from the north point. While our compass is heading south by west look at the north side of the compass—it shows north by east. The north point of our compass is one point east of where it should be, therefore easterly deviation. If our compass shows to the right of where it should we say easterly deviation and if to the left we say westerly deviation. Therefore if we have found out that our compass deviates to the right of the correct bearing we simply allow that amount to the left, or if we find that our compass deviates to the left then allow that much to the right.

Another good way of allowing for deviation is as follows: Port your boat for westerly deviation and starboard for easterly deviation. This means that if you find that your compass has a certain amount of westerly deviation then port your boat just that much. Or if you find that your compass has a certain amount of easterly deviation starboard your boat just that much. You simply pull your boat back where she belongs. If your compass has westerly deviation it is taking your boat just that much to the left or port of where it should. Then to correct your boat's course you just port your boat back again. (See Fig. 4.)

We wish to shape a course from the point A to the point B. These places lie exactly north from each other. We put our ship at north by our compass. But we have previously found that our compass has one point westerly deviation when on north courses. If we continued on our course as shown by our compass we would go considerably to the left of where we should go. Therefore we port our boat one point and this puts us on the correct course from A to B.

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Now remember this, if we find that our compasses have a deviation of a certain amount while heading in a certain direction don't think that they will have the same deviation when heading in any direction. Some compasses are perfect when heading in a northerly direction but show a big error when heading south or east or west. The error should be found for every point of the compass. Four different deviation cards should be made for use on the river ranges. One card should be headed "Going north without cargo." Another should head "Going north loaded." The other two should head "Going south loaded" and "Going south without cargo." The reason that one card won't do for all corrections is that a boat's compass acts differently when light and loaded and also acts differently when going north or south. On each card is written the name of each river range. The correct magnetic bearing of this range is then given and then your ship's heading on that range is given.

Thus:

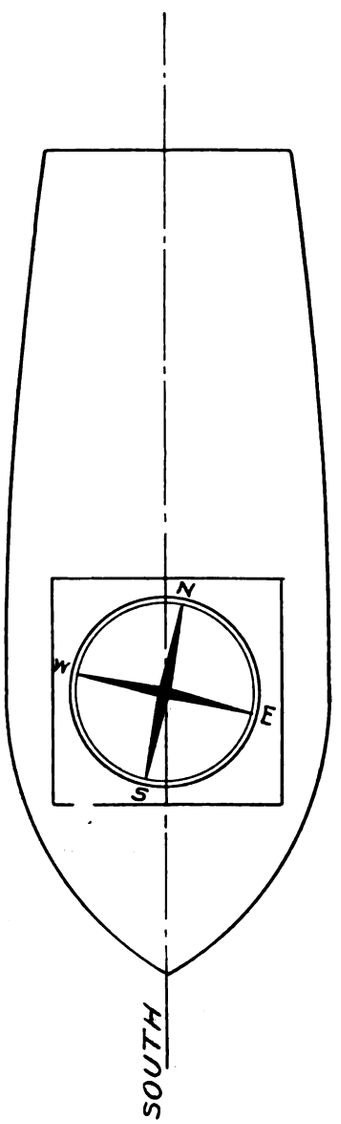
DEVIATION CARD

STEAMER ROOSEVELT — Bound up loaded

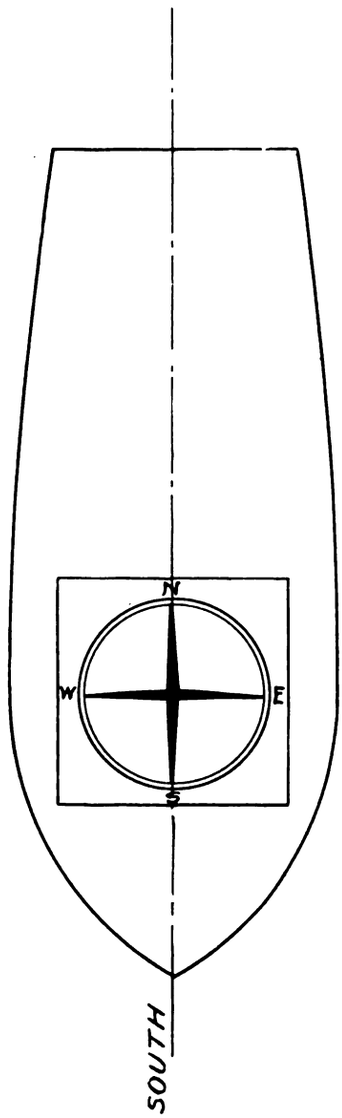
NAME OF RANGE	CORRECT MAGNETIC	STEAMERS COMPASS	DEVIATION
Malden range (astern)	N by W 3/8 W	N by W	3/8 point E
Grosse Isle south	N by E 1/8 E	N 7/8 E	1/4 point W

Under the head of "Deviation cards for river ranges" you will find complete cards for all the river ranges. These can be pasted to a piece of cardboard and taken to the bridge each trip through the rivers. You can see at a glance then whether they have shifted their deviation since the previous trip. The advantage of using deviation cards can be seen at a glance. If you wanted to make a course on the lake of N by W 3/8 W (as shown above) you would have to steer N by W by your steamer's compass.

More about compasses and their fickleness is given under the head of "Expert knowledge of the compass."



OUR COMPASS HEADS LIKE THIS.



BUT IT SHOULD HEAD LIKE THIS.

FIG. 3.

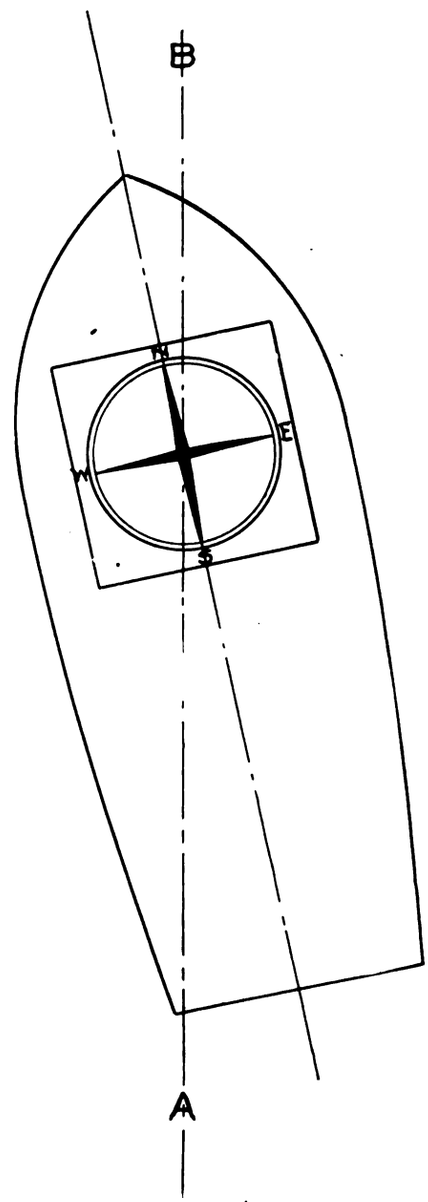


FIG. 4.

An outline of the work is intended here to prepare for finding the error by the heavenly bodies.

How are we to find the error of our compasses when we are where there are no ranges or piers to get

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correct bearings from? We might be leaving a Lake Erie port, bound for the Southeast shoal. For example we will say that we have just left Ashtabula. On coming out the piers we find that our compasses are not heading correctly. The chart shows that we should head north half east when parallel with the piers. We now wish without delay to shape a perfect course to the Southeast shoal. Our new method (new to the most of us) will now furnish us with the means for finding the error of our compasses in just as certain a way as with the ranges.

Before setting up our instruments for use we must also know just what variation of the compass means.

We have shown that Deviation of the compass needle is caused by disturbing influences aboard the boat.

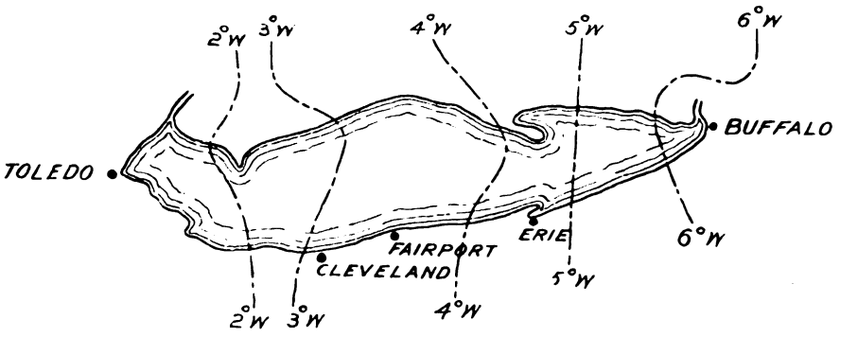
Variation of the compass needle is caused by disturbing influences in the earth. Even if your compass is perfect and shows no error there are very few places on the earth where it will point exactly north. We do not need to find this variation ourselves. Government officials find it for us and supply us with tables or charts that show us just the amount of variation at each place. At Cleveland the north point of the needle is drawn three degrees to the west, at Buffalo six degrees to the west, at Chicago three degrees to the east and so on. In taking bearings of ranges or in making courses we do not need let the two terms (deviation and variation) cause us to get mixed. All courses and bearings given in government books and on charts are true—that is, the variation has not been allowed. When you correct this bearing or course for variation you then make it a magnetic course or bearing. A magnetic course means a course that can be made good by a perfect compass. Our government books and charts might very easily give us magnetic courses and bearings and then we would not have to bother so much about variation. However, several writers of lake pilot books have turned these true courses and bearings into magnetic courses and bearings and we find it very convenient. When we want to find the magnetic bearing of a certain range we simply have to look up the name of this range in the book and do not have to bother about variation at all. The Deviation of our compass is all that we need then bother about. But if we get the bearing of a range from the light-house book or from a chart we must find the variation of the compass at that particular point. We then apply it in just the same manner that we do deviation. If it is easterly variation we allow to the left and if it is westerly we allow to the right.

You must thoroughly understand the difference between variation and deviation. For example we will say that we wish to find the error of our compass on a range that we are coming to. If we have no book or deviation card that shows just what the correct magnetic bearing of that range really is we must find it either on the chart or in the light-house book. By referring to either of these we find that they give a bearing of north by east. We must now find the variation for this locality. We will say (for example) that our variation chart shows us the variation at this place is 5 degrees easterly (practically a half point). We allow this to the left and change our range into a bearing of north half east. If we now headed our boat on this range and found that our compass showed exactly north half east we then have perfect compasses.

When courses and bearings are marked "corrected" or "magnetic" you don't have to allow for variation. This has already been allowed and a perfect compass will follow them exactly. If your compass has error (or deviation) you can follow these courses by allowing for the error. But if courses and bearings are marked "True" you must find the variation given for this locality and allow for it in order to make a course that a perfect compass will follow. The variation on the Great Lakes is not so great as it is in some other parts of the world. The greatest variation here is about one point westerly at the east end of Lake Ontario. At some points it disappears altogether. But there are places on the earth where the compass points east and west instead of north and south.

There would be no use trying to make a compass show true north by the use of an adjusting magnet because the boat might soon sail into a locality where there was a different variation and you would be as badly off as ever. A compass adjuster can adjust your compass for deviation but he can't for variation. If your compass needle is pulled to one side by some steel or iron a magnet can be fastened close to the other side of your compass so that it will draw back the needle to where it should be. If iron aboard the ship pulls your compass needle to one side on Lake Erie it does the same thing on any other lake. But magnetism of the earth causes the variation of the compass. At Buffalo the earth causes the needle to vary about 5 degrees to the west while at Duluth it causes it to vary about 8 degrees to the east.

Maps to show you the variation at different points are made like this:



This map shows the variation at different points on Lake Erie. You will notice crooked lines crossing the lake, each with a number at each end. You will notice that the line passing through Cleveland has 3°W at each end. This means that at any place along this line there are 3 degrees westerly variation. Fairport is about half way between the lines marked 3°W. and 4°W. Therefore the variation at Fairport would be 3½° West. But in allowing for variation it is hardly necessary to get down to half degrees. Use the nearest full degree.

Now suppose you wanted to shape a course from Buffalo to the west end of the lake. Your course will then pass through every line of variation shown on the lake. You would then have to strike an average variation. Add them all together—6, 5, 4, 3, 2. This would make 20°. Then since there are 5 lines you must divide by 5. This would give you an average variation over the whole course of 4 degrees westerly.

In taking bearings of the heavenly bodies the bearings given in the book are "True" therefore you have to allow the variation to get a magnetic bearing.

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SHIP YARD NOTES.

The Gildersleeve Ship Building Co., Portland, Conn., is a recent incorporation by Oliver Gildersleeve, Alfred Gildersleeve and Walter Gildersleeve. The capital stock is $5,000.

The Johnson-Crutti Shipyard & Boatbuilding Co., New Orleans, La., is a new incorporation with a capital stock of $30,000. The incorporators are Peter Crutti, William N. Johnson and Mathias Laska.

Samuel Peters & Son, Wabasha, Minn., are building the steamer Black Hawk for the Carnival City Packet Co., of Davenport, Ia. The Black Hawk is to be 135 ft. long, 27½ ft. beam and 4½ ft. deep.

I. L. Snow & Co., Rockland, Me., are getting out the frame for a three-masted schooner of 450 tons capacity. Work will be begun upon her upon the completion of the Tarrantine, which is now on the stocks.

E. W. Heath, Tacoma, Wash., recently launched the Halibut fishing power boat Active, built for Tacoma owners. She is 60 ft. long and 15 ft. beam and is powered with a 30 H. P. Standard engine.

The Pusey & Jones Co., Wilmington, Del., has recently laid the keel for two yachts, one for a member of the New York Yacht Club, and the other for a great lakes yachtsman. The former boat is to be 190 ft. long.

J. McGill, Shelburne, N. S., has launched the schooner Argina, she being the seventh vessel to leave his ways during 1908. Her dimensions are: Length 98 ft.; breadth 24 ft.; depth 24 ft.; registered tonnage, 98.

The New York Shipbuilding Co., Camden, N. J., is progressing rapidly on the construction of the new Hudson River Day line steamer Robert Fulton, and it is stated that the boat will be ready for service by May 29 as planned.

Hall Bros. Shipbuilding & Marine Railway Co., Winslow, Wash., recently repaired the steam schooner Majestic, owned by Ira J. Harmon, of San Francisco. She was bumped by the steam schooner Yosemite while on her maiden voyage, but her injuries were not of a serious character.

The Bigelow Mfg. Co., Seattle, Wash., has secured a contract for the construction of a powder boat for George Adair, of that city, for service on Puget Sound. The craft will be of very heavy construction and is to be 54 ft. in length by 11 ft. beam. She will be powered by a 40 H. P. Fairbanks-Morse engine.

The Anderson Steamboat Co., Houghton, Wash., launched the big power cruiser Rainier, Jan. 16. She is the largest power yacht on Puget Sound, having day accommodations for 60 people and will berth 16 people for a cruise. The Rainier was built for Andrew Hemrich, of Seattle, and is 85 ft. long, with a 15-ft. beam. She is to have a 75 H. P. six cylinder engine.

Robert Palmer & Son, Noank, Conn, have been awarded a contract for the construction of 10 sand scows for the Goodwin Sand & Gravel Co., of New London. For the first five the price is to be $6,463.89 each and for the second five it will be $6,767.08 each. The scows will each be of the following dimensions: Length, 114 ft.; beam, 32½ ft.; depth, 10 ft.

J. M. Hammitt, Marietta, O., is completing the sternwheel packet Robert Rhea for W. W. Parminter, of Nashville, Tenn. The Rhea is of wood, 150 ft. long, 33 ft. beam and 4 ft. 10 deep. She is equipped with two engines, each with a cylinder 11.2 in. in diameter, by 4 ft. stroke. There are two boilers each 3 ft. 2 in. in diameter by 18 ft. long.

J. McGill, Shelburne, N. S., is reported to have obtained an order from the Valley Steamship Co., of Annapolis, N. S., for the construction of a steamboat to be 107 ft. long, 22 ft. beam and 9 ft. depth of hold. She is intended for the Annapolis-St. John route to replace the Granville, which has recently been sold. The new boat will be fitted with the latest appliances including electric light, steam steering gear and powerful searchlight.

The Commercial Boiler Works, Seattle, Wash., have an order for a boiler for the tug Lorne to be 16 ft. in diameter by 11 ft. 8 in. in length. It will be fitted with four Morrison furnaces. In securing this work the Commercial Boiler Works was in direct competition with British firms as the Lorne hails from British Columbia and the "old country" firms were asked to bid for its construction. A duty of 27½ per cent will be exacted from the manufacturers.

PERSONALS.

Robert Cross has been appointed superintendent of docks at Gary.

Capt. T. M. Potts, at present on duty at the Washington navy yard, has been selected to command the battleship Georgia, to succeed Capt. Edward F. Qualtrough.

Mr. David J. Evans has tendered his resignation as manager of sales, Chicago office, of The Rail Joint Co., effective March 1, 1909, in order to give his personal attention to the Andresen-Evans Co., in which he has been interested since its organization. This company as engineers have developed new types of ore and coal unloading and conveying bridges, grab-buckets, etc. Prior to his association with The Rail Joint Co., Mr. Evans was for a number of years connected with the Chicago office of the Lorain Steel Co., and also the North American Railway Construction Co.

It is officially announced that Sir Hudson Kearley, Bart., M. P., parliamentary secretary to the board of trade, has accepted the appointment of chairman of the first port authority to be constituted under the Port of London Act, 1908. Sir Hudson Kearley has declined any salary in connection with the office.

Mr. Thomas W. Jackman has been appointed chief engineer of the Mutual Transit Co. and Union Steamboat Line with headquarters at Buffalo, N. Y. Mr. Jackman has been in the employ of the Mutual Line and its predecessor, the Northern Steamship Co., as an engineer since 1893, his last boat being the steamer North Wind, and has the proud distinction of being one of a few men on the great lakes holding both an engineer's and a master's license. He is a most capable engineer and mechanic, and his promotion to this important position in the largest fleet of package freighters on the lakes indicates the esteem in which he is held by his employers.

Frank Watkins, compass adjuster with headquarters at Cleveland, is conducting a school at Midland, Ont., known as the Midland Marine School. He has about 25 pupils. One special feature which he is teaching is finding the ship's local apparent sun time, thence the sun's magnetic bearing; the sun's bearing by the ship's compass in comparison, clearly show the deviation and how to name and apply it to make the correct magnetic course. The only exclusive ocean navigation feature taught is that of latitude by meridian altitude of the sun. A sextant is of course necessary, but Mr. Watkins says that the sextant is good for a dozen practical operations in lake navigation, such as survey work, placing buoys, marks, locating wrecks, new shoals. The school is well equipped with all of the latest nautical instruments.

The Lake Torpedo Boat Co., of Bridgeport, Conn., has recently purchased a site for a ship yard in that city and will hereafter construct its own boats instead of building them at the various ship yards on that coast.

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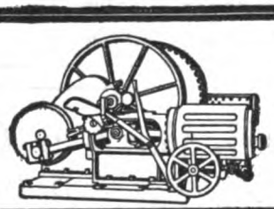
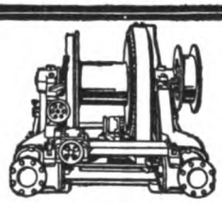
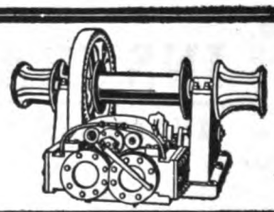

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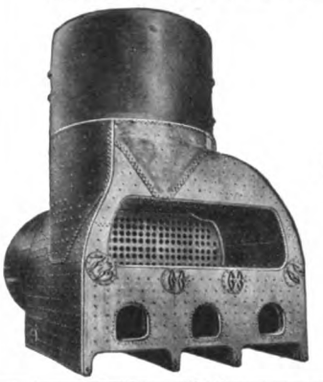

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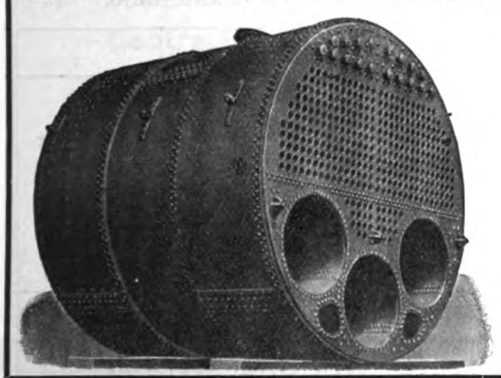

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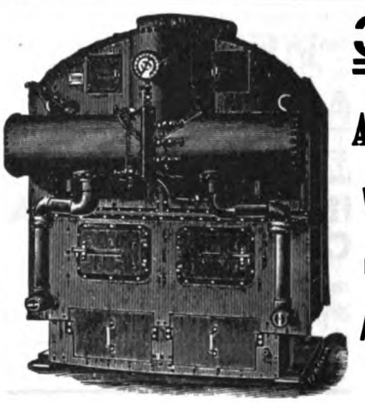

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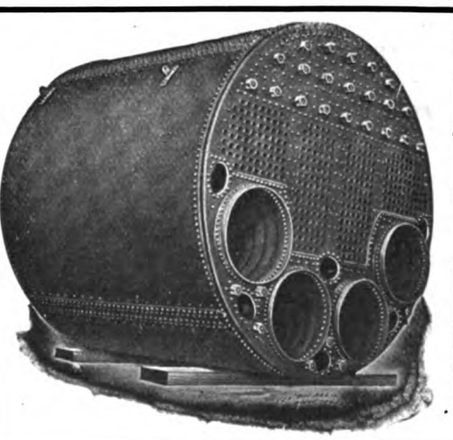

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Jenkins, Russell & Eichelberger, Cleveland, O.
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MacDonald, Ray G., Chicago, Ill.
Marshall, Alexander, Duluth, Minn.
Shaw, Warren, Cady & Oakes, Detroit, Mich.

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